

# The Commercial Car Journal

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## How Many Trucks in Your Territory NEED WINTER EQUIPMENT?

This Article Tells How to Analyze Your Market; How  
to Sell Winter Equipment on a Service Basis and Why  
the Sale of Equipment Leads to New Truck Sales

### ARE YOU GOING TO GET YOUR SHARE OF THIS BUSINESS?

By C. P. SHATTUCK

**A**N Eastern truck distributor has evolved a plan for keeping his sales force 100 per cent active and for building a prospect list. This dealer was averse to reducing his sales force—for he had developed a fine organization—but was aware that one or two salesmen were becoming discouraged, because their earnings fell below those of normal times. Conditions also demanded some method of retrenchment during the fall and winter months, but, being loath to drop men he decided to open a new department. In other words, he planned an intensive educational and sales campaign to sell his own customers, and others, that Equipment and Supplies are essential to the motor truck in cold weather.

#### Profits and Advantages of Campaign

This is not the first time the Commercial Car Journal has advocated the merchandising of winter Equipment and Supplies, but heretofore the average dealer has been too busy selling trucks to seriously consider the profits and advantages of the plan. But in these days the average dealer cannot afford to overlook any opportunity to make a dollar or any plan that will keep his organization intact for the day when the truck industry comes into its own.

The writer holds no brief for the type of dealer—big city or small town—who thinks he cannot sell supplies and equipment to the truck owner, because of the stock of supply house. Repeatedly, dealers have told me that there is no

money in it. Some say that the cut price supply house bars competition. But, they are wrong and a little analysis will prove my contention.

#### Potentiality of Market Immense

The established truck dealer will find that if he compiles a list of customers, plus the supplies and equipment needed on their trucks reasonable percentage of sales to these will yield him a very neat profit with a very small overhead and investment.

Figures might be quoted to indicate the number of trucks in service, but such statistics, unless applied to each dealer's territory, would merely indicate generalities. Such figures when used are apt to reflect the mental attitude of a mechanic who invented an accessory for a flivver. He figured that he could make a profit of \$1 on each sale—there were millions of flivvers—and he would become a multi-millionaire over night. But he didn't. He didn't know how to estimate his real market.

Coming back to the second angle, competition with the cut price house, the writer contends there would be little if any competition, if the dealer would merchandise on a service basis, not on price. It is contended that the truck owner will not pay \$1 for a spark plug, or \$4 for a set to the truck dealer when the owner can purchase them at 79 cents each at a supply house. He saves 84 cents, say the dealers, and 84 cents is worth saving. But the cut price supply house does not install

the plugs, neither has its salesman any interest in the purchaser other than making a profit. And I ask the very pertinent question, does the cut price supply house sell the owner the plug he should use, or one the supply house pushes, because of the profit therein?

#### Selling Service Means Results

Regardless of whether the sale involves a spark plug, jack, tire chains, primer, heater, or windshield cleaner, the writer contends that the cut price supply house salesman is not qualified—either by experience or technical knowledge—to know whether the particular article that he sells is best adapted to the particular truck. Neither does the supply salesman know whether his article will be the cheapest and best in the long run. Nor does he know, or care for that matter, what the cost of installation will be. This may appear a severe criticism of the cut rate supply house, but a dozen cases could be quoted to sustain these contentions, but one will suffice. An owner of a truck, who also drives, found a windshield cleaner very essential so attracted by a cut price supply advertisement, purchased one. He was assured by the salesman that it would fit the truck; in fact, the salesman very glibly explained how it could be attached. But when the purchaser attempted to attach it he discovered that it involved considerable work. There was, he found, another cleaner on the market that could be quickly and easily attached, so he gave away the first

cleaner and purchased the right model. How much did it cost this owner for his cleaner? The point is this: had the owner consulted the dealers' service station, and had the latter been selling or advising truck equipment, the owner would have been saved time and money.

#### Service Must be Merchandised

It may be contended, and rightfully so, that the greater percentage of the truck owners will not consult the dealer, his salesmen or service station when in need of equipment or supplies. Supplying the truck owner therefore means intensive sales effort, education and advertising on the part of the dealer. The equipment cannot be sold by merely stocking it, placing it on shelves and sending out a few circulars. Trucks are not sold that way, at least not in these days. They require real selling and so do supplies and equipment. Some

force was requested to make an analysis on forms which were supplied for the purpose.

#### Analyzing the Market

On these forms various items were checked up, such as the name of purchaser, date, capacity of truck, body, tires, equipment, etc. The industry in which the trucks were used was also indicated. Similar forms were supplied the service station and the inspectors. Instructions were given to obtain data as to how the trucks were used; i.e., the mileage per day; routes; goods transported; what equipment is used; its condition; etc. The service station was requested to make a report on the condition of each chassis; body; equipment; etc.

In the meantime the dealer held conferences with the service head and foreman, and occasionally a mechanic was called in. The dealer smiled when quizzed

in work where efficient lights are essential to safe and economic transportation.

"About 71 per cent are not equipped with tire chains or other form of traction device. Over 92 per cent make no provision for the comfort of the drivers; that is, have no heaters. About 60 odd per cent are not equipped with suitable cabs or enclosures, or curtains protecting the driver against stormy weather or cold. One hundred per cent are not stocked with any anti-freezing solution. Over 90 per cent have no windshield cleaners and a similar per cent are not equipped with radiator cover or hood cover. The survey shows a big market for tire replacements to say nothing of priming devices, odometers, lenses, gloves, etc.

#### Merchandised on Service Basis

"We are not going to sell these articles but we are going to sell service. That is



WHICH ONE OF THESE FELLOWS ARE YOU?

dealers are doing it and it is a good bet that more will be before the snow flies.

How it can be done is explained by the sales plan of the dealer previously referred to in this article.

The first thing he did was to sell his organization. He called a meeting of the sales force, (retail and wholesale) the service head and the foreman of the service station. The dealer opened the conference by asking those who thought it practical and profitable to merchandise Winter Equipment and Supplies to stand up. Just three arose, one salesman, the service head and the foreman. Those not in favor of the plan were asked to give their opinions and they were, said the dealer "the usual objections, the cut rate house; supply stores; etc." The service head wanted to talk, but was silenced by the dealer who closed the meeting with the remark that a second meeting would be held shortly. In the meantime each one of the sales

by any of the sales force, but answered no questions. A meeting was called when the survey was complete and the dealer addressed his force somewhat along these lines:

#### Selling the Organization

"At the previous meeting only three believed in the possibilities of merchandising equipment and supplies for trucks. I have some figures here compiled from our records and your investigations. To August 31 we have sold 1,021 trucks of which number 450 are in the retail territory and 571 are wholesale or in our associate dealers territory. Records for 1921 are not quoted. Of those in the retail territory, 90 per cent or 385 trucks are not equipped with headlights or are in need of replacements and repairs. A detailed analysis will be supplied to each one later. Approximately 50 per cent of these trucks can be sold lighting equipment as they are engaged

the fundamental basis of the campaign. We have allowed a profitable business to go begging, to be snapped up by the passenger car supply and accessory houses, because we have been too busy selling trucks. The motto of this house from now on is **selling service**. Our policies will be directed along these lines from now on and hereafter. No customer, new or old, is going to be allowed to seek that service we should render.

"Did it ever occur to you, gentlemen, that contact with your customer, having his confidence in your house, in the product it sells and its service, are the most valuable assets in sales? As salesmen, you know that the real profits, your bread and butter, are derived from the satisfied customer—the repeat order! A certain manufacturer of passenger cars has adopted a sales slogan, 'What comes after the purchase price?' The answer is service, and service may be interpreted to mean 'that



low maintenance cost through service that satisfies the owner.'

"Our campaign provides for co-ordinating the sales and service departments and the latter will be indirect salesmen. They will educate you gentlemen and teach you how to sell. You are not going to a customer to peddle supplies and equipment, but you are going to sell the customer on a service basis. For example, I have here a report that the Brown-Williams Company operates five of our 2-ton trucks and that deliveries are made in suburban and country districts of its products. Its drivers work until six at night and frequently do not return to the garage until as late as nine. None of the trucks have other than oil lights. Can this company be sold suitable lighting equipment? No, it cannot, **but it can be sold, and will be,** by selling the service the lights will render.

#### Making an Analysis of Lighting

Mr. Meyers, our service head, conducted a novel experiment and it should supply you with a selling idea. He cultivated the driver of a truck and the superintendent of the company. Meyers made a trip or two with the driver, noting deliveries, route, time, etc. He found that the driver lost time by having to proceed carefully on roads not lighted. With my approval Meyers installed a pair of acetylene headlights and a tank. The result was that that truck cut down its own time to a remarkable extent, to say nothing of conserving the driver's energies. I am pleased to state that Meyers has taken an order to equip all five trucks and the profits are very satisfactory. Meyers gets a commission for his sales.

"He sold on a service basis which after all is a saving to the customer, because it increases the efficiency of the trucks and the drivers. In other words, Meyers analyzed conditions and sold service, not lights. Practically the same service sales methods are to be applied to heaters, primers, chains, cabs, curtains, windshield cleaners, etc.

#### Investigating the Products

"We are making an investigation of these products, a most complete one. We will adopt those which have proven the most satisfactory to our trucks and which can be installed with the least probable cost to the customer. We will not handle any line, no matter how attractive the profit, unless it is the best service to our customers. Products will be submitted to our service department and a flat rate of cost of installation determined, and where feasible and practical, the price of the article will include installation. Furthermore, you will be supplied with facts and figures. You will be grounded in the operation and advantages of each device and the service station head will conduct an evening school to teach you gentlemen what each device is, how it functions; all of which will be good sales ammunition for you.

"Each salesman will be given a list of prospects. Most of these will be his old customers. It will be to your advantage to maintain contact with your clients, for it will mean truck sales in the future. Your efforts will not be confined to our trucks, but to sell owners other makes as

well. This will, I believe, augment your prospect list, to say nothing of giving an entree to these owners. Owners of competing trucks are to be sold on the service basis which will give you an opportunity, if nothing else, to merchandise our service.

#### Building the Prospect List

"Prizes are to be offered all employees, except the salesmen, who supply the greatest number of prospects. The plan is very simple and consists of using one's eyes on the streets, country roads and when calling on the trade. Simply note the name, address and license number of every truck not having lights, hood covers, windshield cleaners, etc., and turn in the report to the sales department. Why there are hundreds of prospects in plain sight every day! A big distributor of lighting equipment in New York obtains the bulk of his prospects and business in this manner. Prizes are to be offered each department including the repair shops. Notice is also hereby given that Henry Cline is transferred from the repair shop to the sales force and will merchandise winter equipment and supplies. His knowledge is available to any member of the sales force who desires it.

#### Displays and Advertising

"The campaign will include a vigorous advertising schedule with some real snappy copy. Winter equipment will be displayed in the sales room on trucks and in windows. The demonstrating trucks will be fully equipped and labeled with suitable advertising signs. The wholesale men will educate and train our associate dealers and we will supply, if desired, the material and products to our dealers, so that standard equipment will be used throughout. Commissions will be paid on sales and the percentage will, I believe, be an attractive one. Any remarks?"

There were, of course. One salesman said he would starve if he relied on the profits selling equipment. In reply, the dealer remarked that the campaign was an accessory to the fact and that the fact was selling trucks. "If," argued the dealer, "you convince the prospect you

are not selling him equipment, but real service, will it not establish a contact with the prospect, and will not a continued contact lessen sales resistance when the prospect is ripe for another truck? Putting it another way, will not your calls convince the prospect that you are interested in seeing that he gets the best from his trucks and that you are interested in his welfare even after a sale?"

Another salesman desired to know if the campaign included merchandising spark plugs, tires and other products which the owner might wish to buy direct.

"Yes," replied the dealer, "the greater number of articles named are to be merchandised and to offset the price question, we will sell a service which may not be highly profitable, but will be the means, I think, of educating the customer to rely upon us for advice where such articles are to be used.

"It may interest you to learn that we are considering a service plan whereby ignition, battery, lighting and starting equipment will be serviced by us direct, eliminating sending customers to service stations. Details of the plan, if adopted, will be made known later. We have concluded that to properly service the product we represent, we must supply service and not drive our trade outside, thereby losing contact with both the driver and the owner. In so far as practical a similar plan will be developed among our associate dealers. Those in favor of our winter campaign please stand." All arose.

What this dealer is going to do can be done by every live wire dealer who must realize the vital need of making a dollar and rendering service to his customers, not only now but when the salesman flourishes as of yore. An analysis of your market will reveal exceptional possibilities. There can be no real competition where the merchandising plan is based on service, for, as previously pointed out, the cut rate supply house lacks knowledge of the practical requirements of motor highway transportation and also that desirable factor, contact with the truck owner and user. Let's go.



#### Rapid Transportation Finally Supplants Foot Travel in Canton, China

With the reconstruction work instituted a few years ago, Canton, China, has made a definite step forward in the establishment of motor truck transportation. Upon the recent completion of an extensive urban street-remodeling program, designed to accommodate modern motor traffic, a bus line was inaugurated for the city transportation. This line operates 15 FWD trucks, manufactured by the Four Wheel Drive Auto Co., Clintonville, Wis. The trucks are equipped with bodies of Chinese make and each truck hauls a trailer which is similarly equipped. One unit, consisting of a truck and trailer, has a seating capacity of 70 persons. Service is provided the populace of the city 15 hours of the day to any part of the city of Canton.

# "Better Business is at Hand"

**M. & A. M. A. Members See Rapid Improvement in the Automotive Industry. Prices Have Reached a Sound, Normal Basis**

**T**HAT Better Business is at hand and that a bigger era of prosperity than ever before realized is in store for the automotive industry, was the keynote of every address made before the Fifth Annual Credit Convention of the Motor and Accessory Manufacturers' Association, at Detroit, Sept. 14th to 16th. One thing is certain, that the two hundred or more members present left that meeting with a firm belief that the automotive business has struck the upward curve, and that from now on it will increase gradually, though not very rapidly. There wasn't a pessimistic note voiced during the whole meeting, and every speaker brought further evidence that the turn has come and that the hard working element in the industry is going to make the future better and bigger than ever the past has been.

During the entire meeting a spirit of co-operation was manifested which indicated the desire on the part of the parts manufacturers as a whole to render a service to the automotive buying public which in the past has somewhat been neglected. Although the service question was not a part of the program, statements made by various speakers indicated that the future of the automotive industry depends not alone on price and the sales ability of the dealer and manufacturer, but upon the consideration the owner receives after the sale has been consummated.

## Live and Let Live

In an open discussion on the credit situation, the question arose whether or not the members of the M. & A. M. A. should take matters in hand and clamp down the lid on concerns who during the past year have been unable to extricate themselves from their financial difficulties. The opinion was voiced, that many concerns have had ample time to make restitution but have not as much as paid off a dollar on their indebtedness. Wouldn't it clear the slate for many parts and accessory manufacturers if drastic action was taken immediately against those vehicle builders?

Contrary to expectation, however, the members unanimously agreed that such action would not remedy matters. On the contrary it was contended that such a procedure would tend to disorganize and lower the moral of the industry and force some concerns to the wall which otherwise will come through successfully with the better business conditions which are noticeable every day.

The manufacturers as a whole feel that it would be policy to give those manufacturers who really are trying their best to get back on their feet, a further chance to make good, but a strong feeling of

resentment against the "fly-by-nights" was displayed.

This meeting was incidentally the best the association ever held, both from a standpoint of attendance and in the variety of subjects dealt with by the speakers. Hardly a phase of the industry's activities was passed without bringing forth some instructive suggestions or comments.

The following paragraphs will give our readers a review in brief of the statements made and subjects discussed at this convention:

## 1913 is "Last Year"

J. P. Harris, vice-president of the Union Trust Co. of Cleveland, stated that "to you in this industry, 1913 is 'last year'—the last business year you should figure. The quicker your industry realizes this the better it will be for all."

He stated that the supply of credit the world over is now above normal, the bear market is over and that securities are going up.

J. H. Collins, Manager, Commercial Research Department, Chilton Co., proved his contentions from figures on production, export, import and increase in registrations, that it will not be many years when the entire factory equipment of the industry as it stands today will be needed to build cars for the replacement alone of cars going annually out of use in this country. This statement was based on six years as the average life of a car.

Harry G. Moock, general manager of the N. A. D. A., gave the convention the dealers' side of the picture. He outlined the progress made toward getting factory and dealer together on a better plane of understanding.

His recital of what had been accomplished in sending out lecturers demonstrating the correct service of well known units was listened to with interest and several manufacturers will take advantage of this opportunity when this traveling school idea is started again this winter.

## Salvation Lies in Sales

Credit matters took up the greater part of the second morning session. George J. Johnstone told of the work of the association's credit grading committee, and C. H. Dickerson, vice-president of the Timken-Detroit Axle Co., gave a masterly presentation of "Credit Policies Under Present Conditions."

"Paradoxical as it may seem," said Mr. Dickerson, "credit dealt the industry a bad blow, and only through credit will it recover."

After pointing out present business conditions he said that anyone contemplating going into this business today had better

figure all contingencies and then add 100 per cent to his estimate.

Salvation of the industry today lies in sales, and he urged every possible energy be employed along this line.

The personal equation in granting credits was summed up by A. H. D. Altree, vice-president of the American Bosch Magneto Corp., in the following:

"Does the man asking credit look you squarely in the eye, and would you lend him your own money?"

Theodore H. Price, editor of "Commerce and Finance," of New York, gave a masterly presentation of the development of civilization through the use of the wheel, and saw nothing but a greater and better automotive industry in future.

No one voiced the sentiment of co-operation more strongly than H. H. Rice, president of the Cadillac company, who was the final speaker on the opening day, and who came as the representative of the N. A. C. C.

"The tide has turned," said Mr. Rice. "There is no occasion for too much optimism, but there are many minor indications and sufficient straws to show that the trade winds are blowing in the right direction."

"In August last year the shipments of cars manufactured by companies affiliated with the National Chamber were 14 per cent below shipments made in July. This year's shipments in August were 2 per cent above, a gain of 16 per cent."

## Efficiency Greater Throughout Industry

Mr. Rice spoke particularly of the startling increase in efficiency among workmen in the automotive industry, and said that if we could have the same increased efficiency among coal mining and railway workers it would be one of the biggest helps the country could hope for in getting back to a better business basis. He quoted Herbert Hoover as saying this would make possible a reduction of freight rates, one of the most necessary things today.

E. H. Broadwell, president of the association, called the convention to order and directed the first day's session, relinquishing the gavel on the second day to vice-president W. O. Rutherford. The sentiment expressed by Mr. Broadwell that "Civilization will not go into reverse; the automobile industry must go forward" prevailed to a marked degree.

The morning session was given over to a thorough explanation of the association's activities as showing how the members may get the greatest possible good from their affiliation. The speakers were General Manager M. L. Heminway, Credit Manager C. A. Burrell and Traffic Manager Herman Deuster.



The first speaker at the afternoon session was J. M. McComb, vice-president Crucible Steel Co. of America, who spoke for the raw material producer under the general topic of "Business Conditions in the Automotive Industry and Prospects for the Future."

Mr. McComb stressed the encouragement to be seen in the better business methods forced upon the industry and pointed out that many credit difficulties of the past would be eliminated through the safer and better buying methods which the change has produced.

M. A. Moynihan, of the Gemmer Mfg. Co., treated present conditions semi-humorously as the passing of an epidemic, stating that the "epidemic has passed and doctors tell us it will not return for 14 years," citing past business depressions at periods of 14 years apart. "Beware," he

said, "of 1935 and a Democratic administration."

#### Motor Truck Expansion Through Bus Development

The last session was featured by a paper by E. W. Clark, advertising manager of the Clark Equipment Co., who pointed out the tremendous future of the motor bus in this country and in this future saw the greater expansion of the motor truck industry.

Wm. H. Huff, advertising manager of the Distel Wheel Corp., advocated co-operative advertising on a large scale to sell automotive equipment and parts, and association activity to bring about more effective dealer salesmanship. He injected a lot of humor into his talk which brought many smiles to his auditors.

W. O. Rutherford, vice-president of the Goodrich Tire & Rubber Co., told those present that they should "dream of ease and work like Hell!" He said that this industry has moved fast and that today those in it must get right down to fundamentals, and use new methods where new methods are necessary and convert their men to these new methods in success is to be attained.

F. S. Armstrong, sales manager of the Vesta Battery Co., and C. B. Davis, secretary and treasurer of the Warner Gear Co., of Muncie, Ind., spoke along lines of better business and increased energy in selling.

The convention, arranged by Manager M. L. Heminway, ably assisted by M. Lincoln Schuster, manager of the educational department, was the most successful ever held by the association.

### Some Pertinent Facts on

# The Future of the Motor Bus

## A Field Which is Only in Its Infancy. Makeshifts Must Give Way to Specially Constructed Jobs

IT was only a few years ago that a very large percentage of the motor trucks in use were, in reality, but converted passenger car chassis," said Mr. Clark. "The use of these converted motor trucks soon developed two facts: First—that the world needed motor trucks. Second—that a passenger chassis could not be made to do double duty in the specialized field of freight transportation.

"Today a very large percentage of motor buses used in America are built on regular truck chassis. The use of these converted motor buses has developed two facts: First—that America needs motor buses. Second—that converted motor truck chassis cannot be made to do double duty in the specialized field of commercial passenger transportation.

"The population of the United States increases approximately 20 per cent every ten years. It has increased from 75,000,000 in 1900 to 105,000,000 in 1920, of which a disproportionate percentage has occurred in the cities. Urban population is increasing at the rate of 34.9 per cent as compared with 11.1 per cent in rural districts. The burden of transporting the immense armies of city workers to and from their homes each day has fallen, in the main, upon the trolley systems of America."

"The cessation of trolley construction has been due to the increasing costs of construction and the growth of the automobile as a passenger carrying vehicle. This new unit of transportation has supplemented existing transportation systems and by reason of its speed and flexibility,

Before the Credit Managers' Convention of the M. & A. M. A., Ezra W. Clark, of the Clark Equipment Company, Buchanan, Mich., made an address in which he predicted that the next few years will see the establishment of motor bus lines in nearly all of our American cities, either by or in competition with the traction lines.

Mr. Clark contends that the building of specially designed motor buses offers a potentially profitable field for the next few years. He particularly laid emphasis upon the fact that the requirements of the motor bus field were such that truck manufacturers must design special chassis for this class of vehicle, as it has been demonstrated many times that the standard motor truck chassis is not suitable for conversion into a motor bus.

has greatly enlarged the residential sections of all our cities. Our streets have now become too crowded for the convenient use of personal cars. The parking requirements are so onerous as to seriously restrict the bringing of private cars into the business districts of our municipalities.

"Sporadic outbreaks of 'jitneys' in various cities show the possibilities of motorized passenger transportation—these epidemics have also shown the fallacy of trying to operate high-powered, small capacity passenger automobiles at a profit. The public has been educated at the expense of the 'jitney' owners and operators.

"The growth and development of most cities has radiated from their business sections along fixed lines of transportation so that in many cities 'outlying' and 'neighborhood' business and recreation centers have grown up with startling rapidity.

"An analysis of the transportation facilities of any of our cities, in view of these facts, will show a wonderful opportunity now open to improve the present systems with motor bus lines. These may be operated by and in conjunction with the present trolley systems or by independent companies over routes laid out by city authorities so as to bring the wage earners of the cities into close touch with their places of employment and recreation.

"Every city owes to its citizens the duty of providing quick, convenient and comfortable means of transportation to and from their regular employment and recreation. This is a civic obligation that may be delayed but cannot be permanently avoided by municipal graft or corruption.

"The quickest, most convenient and most comfortable way in which the present transportation systems of our cities

can be supplemented and enlarged, is by the development and use of the motor bus. An exhibition of the successful operation of motor bus lines in some of our larger cities indicates that this phase of city life will see a marvelous and stupendous growth in the next few years.

"Specialized work requires specialized equipment. The character of service required should govern the design and construction of motor vehicles used for the commercial transportation of passengers. Eliminating the automobile and taxicab, motorized passenger vehicles may be divided into the following four classifications:

**School Buses:** The development of the automobile has made rather startling changes in the systems of rural education. The isolated 'little red school house' is being abandoned in favor of larger consolidated schools in the centers of rural population. This evolution means larger and better schools with a consequent raising of the standards of instruction. School buses operated by townships and school districts, make regular runs, bringing the children to the central grade schools. Buses for this service are of two types,—very light construction for use on dirt and unimproved roads, and the heavier type designed for use on improved and hard roads.

**Motor Stages:** Seating from 12 to 20 passengers, operated by one man, pneumatic tired—speed of 20 to 35 m.p.h.

"This type of vehicle is suitable for suburban service and passenger traffic between cities. Motor stages of this type—the European 'Charabanc'—are now very largely used in California and many of the western railroads are using them as feeders to and from their divisional points.

**Single Deck Buses:** Seating from 18 to 30 passengers; operated by one man; pneumatic tires or cushion wheels; speed governed by ordinance.

"This type of bus can be used to supplement the service of double deck buses during the peak hours in cities where the volume of traffic does not require the use of a heavier type bus; also used as extensions to double deck but service carrying passengers further out into the suburbs; can be used by public utility companies to supplement present trolley systems and as cross town feeders. At present it is almost impossible to raise money for public utility extensions and improvements, and this type of bus presents an inexpensive method of extending present facilities without the need of expensive track and power house construction. This type of bus can also be used for transfer of passengers between railroad terminals and hotels.

**Double Deck Buses:** Seating from 40 to 50 passengers, manned by driver and conductor; operated on solid tires or cushion wheel.

"This type of motor bus is indicated for service along regular routes preferably on streets not occupied by trolley tracks, covering distances from 4 to 10 miles, along the main arteries of traffic. They can be profitably operated in large cities

and in smaller cities where there is a heavy peak load at certain hours of the day.

"There are, in addition to the types mentioned, one or two other phases of motor bus construction which may be described as incident to a period of transition. In this class should be placed the trolley bus, operating without tracks on rubber tires, obtaining its power from an overhead trolley. Also, the flanged wheel motor bus, operating economically and efficiently as a passenger vehicle on short line railroads where the traffic does not warrant the use of expensive railroad equipment.

"Motor bus operation in many cities has shown that standard truck chassis are not suitable for motor bus construction and service for the following reasons: excessive weight; too much unsprung weight; high center of gravity; rigidity of suspension; unsuitable gear ratios; narrow treads; large turning radius; stiff steering gear; high top clearance; high passenger floor; too short wheelbase, causing dangerous overhang.

"The development of these shortcomings of standard truck construction shows the necessity of special construction for motor buses covering the following points:

- Lightness with strength (insuring minimum gas consumption.)
- Small unsprung weight.
- Low center of gravity.
- Flexible control.
- Special transmission.
- Wide treads (eliminating swaying of bus.)
- Ample wheel base (to prevent undue overhang.)
- Short turning radius.
- Low-step entrance and exit.
- Low top clearance.
- Curb receipt and delivery of passengers.
- Ample brake capacity (to provide for frequent stops.)
- High-low gear efficiency (to provide for frequent starts.)

"The above points cover the desirable and undesirable features to be considered

in the construction of double and single deck buses for regular city routes. Motor stages and school buses also involve special considerations in design, but time does not permit an enumeration of these factors.

#### Bus Trailers

"Consideration should also be given to the use of bus trailers in the peak hours of traffic. They should have their own brake equipment.

"Out of the motor truck industry will arise in the next few years, THE SPIRIT OF TRANSPORTATION, which will give to America automotive transportation of passengers in specially designed motor buses. The nation now needs and can use a sufficient number of motor buses of the various types enumerated, to keep our combined motor truck factories in continuous production for years to come, an activity which will bring business to practically every member of the Motor & Accessory Manufacturers' Association, for these motor buses will need frames, engines, transmissions, springs, tires, bushings, bearings, lamps, seats, fenders and all the other necessary components that enter into the construction of commercial cars, not overlooking in this last analysis, rear axles. Many of these component parts and accessories can be used as standard units. Other parts need special designing in order to produce a special vehicle for a special purpose.

#### Wood Wheel Men to Join M. & A. M. A.

In session at Lansing, Mich., recently, the Automotive Wood Wheel Manufacturers' Association voted to dissolve their association and reorganize in January as the Wood Wheel Group of the Motor and Accessory Manufacturers' Association. Plans for affiliating with the national organization were accomplished through the co-operation of M. L. Hemingway, general manager of the M. & A. M. A. The organization will hold the last meeting in New York City during show week.



#### Veteran Truck Salesman Combines Pleasure and Recreation With Business

Chas. B. Wood, of Cincinnati, recognizing the advertising and sales value of a trans-continental truck tour, proposed the project which resulted in a trans-continental trip with Los Angeles, Cal., as the ultimate objective. Representing the G. A. Schacht Motor Truck Co., Cincinnati, Ohio, in a special sales capacity, and the Highland Body Co., Cincinnati, Ohio, as well as Mr. Wood anticipates very optimistic results, both from a business and pleasure standpoint. The truck is Schacht worm drive, of two-tons capacity, which has already covered over 100,000 miles. The reason for this is obvious. What would your thoughts be were you a disinterested observer of the above outfit?



## Business Thrives for Philadelphia's

**"Serve-Self" Truck Garage***Customers Wash and Adjust Own Vehicles**Higher Monthly Charge Covers Expense*

**P**HILADELPHIA, home of the self-serve cafeteria, has a truck garage conducted on a similar plan. True, the customer doesn't have to drop nickels in a slot to get results, but he waits on himself, even to the extent of washing his own vehicle and repairing it.

The garage, which is 100 x 130 ft., is operated at 811 N. Taney St. by F. Lyons and W. N. Wilkins. It is advertised nowhere but on the front of the building, by signs of the usual kind, and in the city telephone directory, where small display space is taken.

"Customers aren't just permitted to wash and repair their cars," explains Wilkins; "they are expected to do it. In fact, nobody will do it for them, except in a case of emergency. Everything is wide open here, and our confidence never misplaced thus far in our customers."

This is all the more remarkable when it is known that those who store their cars here have free use of the following:

About \$500 worth of small tools, 20-ft. work-bench equipped with vises, mounted electric drill, motor stand, emery wheel, chain block. The washstand at which they may work is equipped with drain and good lighting facilities.

"Our patrons are thoughtful, too," says Wilkins. "When they have finished working they even habitually cover up the emery wheel and hook up reel light."

Not a day or a night passes that customers are not "tinkering" with and washing their vehicles, except on Sunday,

**DO YOUR OWN "TINKERING"**

*Here are customers' privileges in this uncommon garage:*

*Portable electric drill, so mounted as to be equal to heavy drill.*

*Stout motor stand, capable of sustaining weight of any engine.*

*Chain-block operated by overhead system.*

*Emery wheel for grinding parts.*

*Reel lights.*

*Approximately \$500 worth of small tools, including wrenches, pullers and the like.*

*Twenty-foot work-bench.*

*Car washing stand, with plenty of buckets, sponges and brushes.*

By K. H. LANSING

when there is rarely a truck owner or driver about the place. The garage accepts about twenty-five passenger cars for storage in addition to the trucks.

"We make a specialty of trucks," says Wilkins, "and would rather have them any day than passenger cars. When a truck comes in on a Saturday night it is through till Monday morning and doesn't have to be moved."

**Mostly Mechanics**

Those who store passenger cars here are, in virtually all cases, working men. Some are shipyard foremen, others are general mechanics, others are pressmen, and so on down the line. They are quite capable of doing their own repairing of the lighter sort. Some even thoroughly overhaul their motors. Of course, nearly all the drivers of the trucks stored here are more or less expert in making minor adjustments and doing light repair work. There is little or no amateur botching that needs assistance to be set right.

Because of this "wide open" plan, a total stranger, unknown, for instance, to even a friend of any one connected with

the place, would not find it particularly easy to store his car here immediately. He would have to be checked up by some one about the garage before being put on a "help yourself" basis.

"We all know one another here," says Wilkins.

While customers even open and close the garage doors themselves, one employe is assigned to the duty of

seeing them in and out, to prevent collisions, or any other untoward occurrences.

Buckets, sponges and brushes are supplied for the use of customers who wash their cars. There is no direct charge for this accommodation, any more than for any other. All this sort of expense is cared for in the slightly higher charge for storage—the only item. But, while the customer might, for instance, store a Ford in another garage for seven dollars a month, yet be charged ten dollars in this "serve-self" establishment, he considers the extra accommodation of being able to save on washing his car under comfortable circumstances and repairing it with a full complement of good, appropriate tools and other mechanism. Charges for larger vehicles range from \$12 to \$15 a month.

In case of a serious accident to a customer's truck or automobile, such as the breaking of a spring, the garage has a list of outside machine shops from which the customer could make a choice to have his vehicle sent.

Of course, no one need select from this



No, This is Not a Garage Hand. "Help Yourself" is the Slogan of This Garage



Work-bench Where Garage Customers Work on the "Serve-Self" Plan

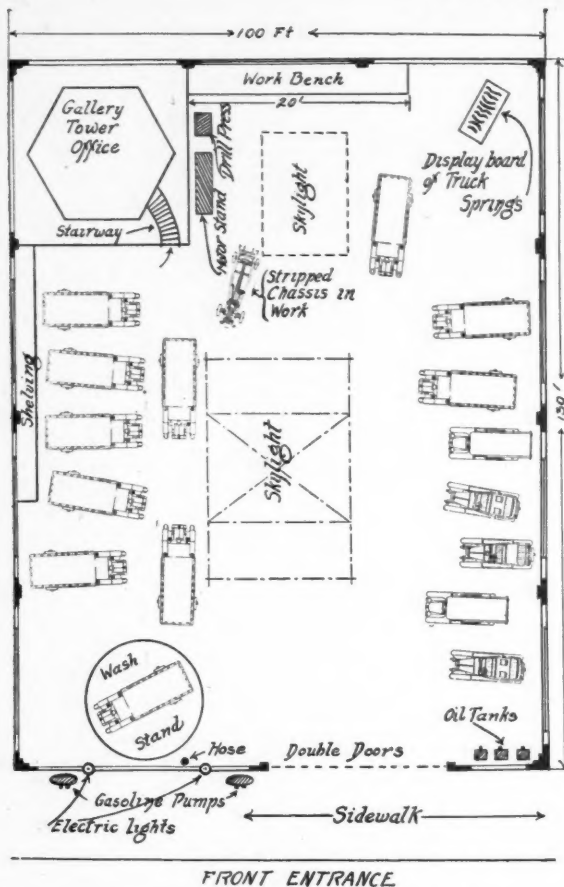


Diagram of the Taney Auto Repair Shop,  
Philadelphia

list. A customer could "serve himself" in that way, too.

ployes are lower than in the usual type of garage.

## Trucks Save \$28.80 Per Day Over Team Equipment

**T**HAT the truck is considerably cheaper than horse equipment and that the work of road building can be carried on with greater dispatch is the unanimous opinion of most road contractors and highway superintendents. Highway superintendents are so very busy these days pushing road work to completion that few of them are inclined to keep an accurate account of their expenses. They are satisfied that the trucks are saving them money and what's more, lots of time.

Wm. Tonkel, road superintendent of Allen county, Ft. Wayne, Ind., is keeping an accurate account of all road building projects in his precinct and submits figures which show that trucks are big money and time savers.

"Allen County," says Mr. Tonkel, "uses its trucks entirely for maintenance and repair work. When new roads are to be constructed, the work is let out under contract. For this maintenance and repair work we decided that a 3½ ton truck is too heavy. Our trucks have a 3½ yard body which is always heaped up, so we carry approximately 4 yards of stone, weighing approximately 5 tons. This is

something of an overload, but our trucks stand up very well under it. The northern part of Allen County is rather hilly; the rest is fairly flat. Our roads are made of crushed stone, macadam and gravel.

"At present we are repairing a piece of road 10 miles from Ft. Wayne, making a 20 mile round trip. The material is

Lyons and Wilkens keep a limited stock of truck parts and equipment for sale. A stock of truck springs, samples of which are kept in plain view on the floor, near the common work-bench, is sold by this concern on commission. The garage does not make a business, however, of handling passenger car parts and accessories. The heaviest call here is for truck gears and brake parts.

So there will be as much floor space as possible, the office of the garage is in a sort of tower gallery at the rear, overlooking the entire floor.

Care is taken to keep the central space of the floor clear for egress and ingress. The trucks are stalled along one wall and the rear of the building, with the passenger cars in a space against the opposite wall. Not more than thirty-five vehicles are housed in the garage at one time.

There is little or no reason for elaborate records or card systems here, because of the plan upon which the garage is conducted. One or two employees are sufficient and overhead is lower than in the usual type of garage.

crushed stone, which is delivered at Ft. Wayne, in freight cars. The truck is loaded by hand or by a chute, and run out to the point where the road is being repaired. A dump body with adjustable tail gate permits the even distribution of stone along the road. After discharging his load, he returns to town for another.

"It is very easy to make four such trips in a day, and if forced a little, we could make five. However, making four a day we can haul 16 yards of stone per truck to the point. The cost per day on this haul is \$19.26, or \$1.20 per yard, and 1.24 cents per yard-mile. If a team were to do this work, it could make only one trip a day hauling 2 yards of material. A team costs \$6 a day, so it would cost us \$3 per yard to haul stone to this point, against a cost of \$1.20 by truck. Besides, a team could not spread stone as the truck does.

"Suppose that, instead of repairing this road, we were building it. It takes 1166 yards of gravel to build a mile of road. Hauling by team and handling 2 yards of gravel per day, it would take us 583 days to perform the work. A truck, handling 4 yards of gravel to the load, or 16 yards a day, could do it in 67 days. At the very low cost of \$6 a day for a team, it would cost us \$2208 to haul the material; hauling by truck, at a cost of \$19.26 a day, it would cost us \$1290.37, giving us a saving of \$917.63.

"Building a mile of road that distance from town would cost us by truck \$1.11 per yard, and by team, \$1.89 per yard, a saving of 78.7 cents per yard, or 41 6/10 per cent, in favor of the truck. But even though the truck did cost more, it would still pay a road superintendent to use a truck because of the greater amount of material that he could handle in a given time. As in all outside work, it is necessary to make the most of good weather.

"The trucks employed in this service make a very high mileage, averaging from 75 to 90 miles a day. The average for an Acme truck last year was approximately 74.5 miles. The very low fixed expense of 93.3 cents a day is due to the fact that these trucks have no taxes, license, or administrative overhead, and only a low garage and insurance charge. Last winter was very open and we were able to work 285 out of 305 working days. The average cost for the time worked was \$18.37 per day. All our repair charges are lumped, but the \$600 per year is ample.

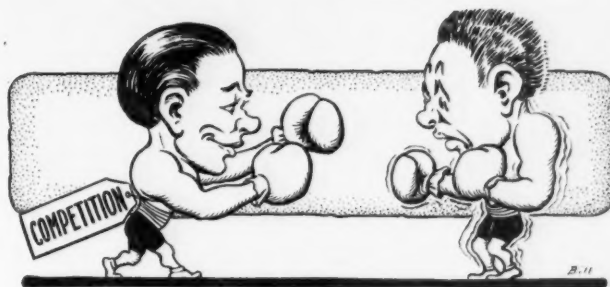


Acme Three and a Half Ton Job on One of Its Daily Four-Trip Hauls. Operating Cost Per Day is Estimated at \$19.26



# Are You Half Licked Before You Start a Sale?

*It is Essential to Respect Competition, But It Does Not Pay to Fear It*



## Why This Dealer is Failing to Make Many Sales

By A. W. BROWNELL, Advertising Manager Commercial Car Journal

**R**ECENTLY two clean cut, intelligent men of the local automotive trade came to my office and asked if a certain motor truck manufacturer was open to a new distributor proposition in Philadelphia.

Before answering, I inquired why they thought this particular manufacturer would be likely to consider a change in this important territory from his present representation.

One of the men replied: "The present dealer is a good man, intelligent and hard working, maintains good service facilities and is apparently well financed, but—he is representing his manufacturer on a defensive basis."

When asked what he meant by this, he replied:

"This man is apparently frightened by the competition coming from other dealers. He knows he has a good truck but he has fallen into the habit of assuming a defensive attitude in his sales efforts rather than assuming and maintaining an offensive position."

### Don't Cringe; be Assertive

"In short, he is constantly being impressed with stories that certain other popular makes of trucks are out-performing and out-selling his own, and as a result is half licked when he goes in to sell a prospect."

"His sales arguments are good and he sees his prospects often and regularly, he also has a good personality, but there is something vital lacking in the way he presents his arguments and in his final stand for the signed order."

After these men left I began to analyze what they had said and I realized that there are many dealers and salesmen who unconsciously are falling down in the same way.

We are too prone to look with envy upon the pasture next to us and wish we were over there, because it looks so much more fertile and attractive.

We too often feel the other

salesman has the edge on us, both in sales ability and in value of product.

It is rather easy for a truck dealer to form this mental attitude—he is one of many dealers in the territory competing for orders. He is in daily competition with most of these men. The prospects whom he calls upon often point out supposedly superior mechanical features in the other fellow's truck and argue that this particular dealer is not offering as much in service, etc.

Happening day after day this is likely to break down the dealer's morale and place him on the defensive—just as is the case with the dealer referred to above.

When a dealer selects a truck or line of trucks to represent, in a particular territory, there must be good reasons for the selection, at least enough for the dealer to stake his time and money against the sales value of the make of trucks selected.

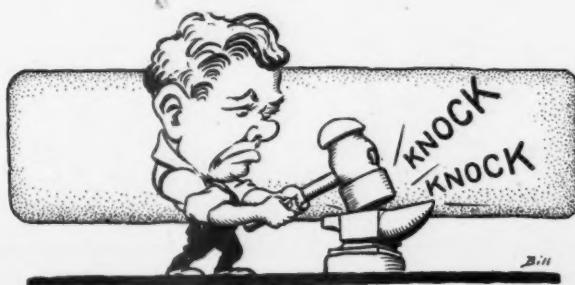
### Waning Enthusiasm Sure Failure

Assuming such to be the case, the dealer must, to be successful, constantly retain that fine confidence and enthusiasm regarding his product so manifest at the time of undertaking his first sale for the new line.

It is essential to respect competition, but it does not pay anyone to fear it.

When you knock the other fellow's truck it shows you fear its competition. When another salesman hammers yours it shows he fears your competition.

The more the other fellow knocks the better and more confident you should feel.



Remember he can't sell his truck by criticizing yours—therefore why should you fear this sort of competition and allow it to lower your morale.

I know a successful business man who has a number of salesmen calling upon him daily, representing numerous and diversified products. Some of these products he wants to buy—actually needs them, but his policy is never to buy, but to be sold. In other words, he tests out the selling ability of each man by bringing up objections one after another.

The salesman who gets his order has to work for it aggressively—has to retain the offensive in his own hands. To do this he must have both confidence in and enthusiasm for his product and he must definitely show why he has reason for his belief.

### Aggressive Confidence Sure Winner

Many truck prospects are like this particular business man—they must be sold before they will sign the well-known dotted line—and today nothing less than sincere confidence and real enthusiasm will turn a worth-while sale.

Therefore the dealer who assumes the offensive at the outset of the interview and retains the offensive throughout, who talks of his product with confidence and enthusiasm, who compares the mechanical features of his truck with those of his competitors through suggestion rather than by knocking, who does not allow the prospect to become a better buyer than the dealer is salesman—plus having a good conception of the manufacturer's haulage problems and their answers, is the man who is bound to command respect, and is sure to be a successful salesman and dealer.

Remember that vital spark of confidence and enthusiasm which is so essential no matter whether it be used in selling truck transportation or in beating the other chap in eighteen holes of medal golf.

Keep the offensive—and your selling success is assured.

## *If Your Motor Truck Tire Sales Slow Up* **THERE'S A REASON!**

**The Truck Tire of Today is a Proven Institution. Generally, Poor Tire Showing is the Direct Result of Improper Load Distribution, Ignorance and Other Evil Practices**

*Educate the User to Recognize These Facts and You'll Do Both Him and Yourself a Service*

By A. V. COMINGS

**T**HIS has been a hard summer for the truck dealer. Like all other business men he has had to meet conditions not at all to his liking, but most of the better type of dealers have made the grade and are ready for the better business that now seems assured in slowly increasing volume.

It has been a time to try the souls of the better class of business men of this country. They have had to meet competition of the worst sort, yet it is the

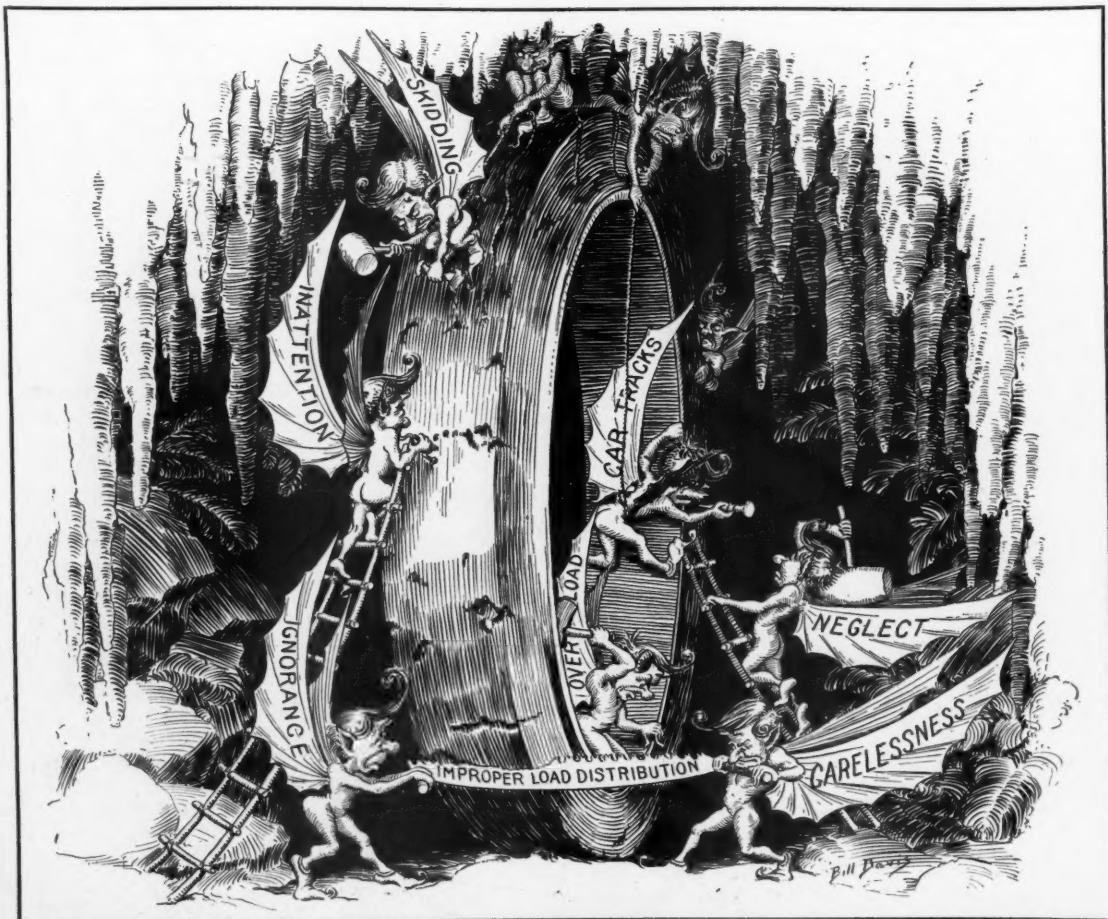
truck tire dealer who has not yielded to the temptation to lower his standards of doing business who is surviving, and who is going to get the big share of the future business.

The thoughtful tire dealer is giving more attention to the things that bring success, or bring failure, in his business, and in this he is being guided in every way possible by his factory. For the big factories, at Akron and elsewhere, are alive to the present conditions, and are helping their dealers as never before

with advice, educational work, and in every way possible.

The manufacturer, because he can draw on the experience of thousands of dealers and can see what is wrong or what is right in their methods, is in a position to help his dealer organization wonderfully. And this help is being extended to dealers today, generously and freely.

Many a truck tire dealer fails because he doesn't take full advantage of all the sales possibilities in his territory. He thinks he is working every prospect, but



Is the Tire Always Responsible?



careful analysis of the territory will show differently.

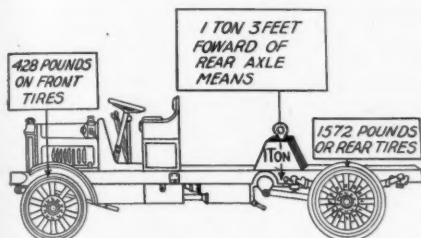
There was the case of a certain Eastern tire dealer, for instance, who owed one of the big Akron companies \$5000, and who seemed utterly unable to make any headway toward building up a profitable business. Yet, he was in the center of an excellent tire territory.

So the company sent one of their sales force down to analyze the man's field and to show him, if possible, where he could improve his business methods.

#### Every Problem Has Its "X"

This expert found that the dealer had a list of but 156 prospects and was working this small list day after day. The factory man knew there were more tire sales possibilities in this territory, so he got busy, and the result was he unearthed 1500 prospects who were using trucks and who were logical buyers of tires in this dealer's territory.

The factory man got the addresses of all these truck owners and routed the deal-



er's salesmen for him, so that they called on the prospects in such rotation that no time was lost, and the result was that the salesmen were able to call on several times as many prospects as formerly. Repeated prospects' calls gets business, if the salesman is really a salesman, and, of course, business began to pick up immediately.

Within two months this dealer had paid off the \$5000 he owed the factory and had ordered \$8000 worth of tires in addition, which he paid for when the bill came due thirty days later. This is the story of an actual case.

Does systematic and thorough cultivation of the territory pay the truck tire dealer?

This incident, which is but one of many similar ones worked out all over the country, surely proves that it does.

Every big manufacturer of truck tires is ready and willing to help the truck tire dealer solve his problems, is ready as a rule to send an expert into the dealer's territory to see where the dealer is at fault, and to help the dealer build up his business in every way.

#### Not More But Better Dealers

The big tire companies do not, as a rule, want more tire dealers these days. They want better tire dealers, and the result is they are training their salesmen and their district men to not only sell the dealers his tire supply, but to teach the dealer how to best sell his merchandise. The factories know that if they show a dealer, who is merely dubbing along and struggling hard to make both ends meet, how to make his business pay well, with-

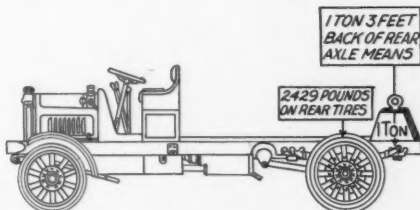
out any more real work on his part, merely better directed work, that the dealer is going to be a better customer of the factory, for he will be selling a lot more truck tires.

#### Don't Cut Prices

It is easy enough to cut prices on tires to make a sale. That's why there are so few genuinely successful truck tire merchants today. Many dealers follow the easiest way, and soon pass out of the picture.

It costs money to run a tire business and give the kind of tire service that keeps trucks running. The truck owner **must** be sold on this fact, either now or eventually. If he is a really good business man he can be sold by a proper presentation of facts and figures. Get those figures together on your business, and show him why he has to pay list price to save money for himself.

The truck tire sales manager of one of the big Akron tire manufacturing companies told the writer once that time and again, in going around among his dealers over the country, he has had to listen to stories of "that dealer down the street is ruining us by cutting prices." On his next round nothing would be said about



"that dealer down the street," for "that dealer" had long since gone out of business and no longer figured in the reckoning. And the dealer who had complained of him, but who still had had nerve enough to maintain his prices, was still doing business at the same old stand.

And you'll find that where there is a successful tire dealer, he is not the one who has a reputation for price cutting.

#### What Service Means to Sales

It is sometimes very difficult to make a truck owner see the value to him—not the theoretical value, but the actual dollars-and-cents value—of buying his tires from the dealer who is equipped to give him the right kind of service.

And by equipped I mean that the dealer shall have not only a complete supply of tires and the shop and tools to do the work with, but that he shall have drilled into his organization the **spirit of service** so thoroughly that his men are eager and ready at all times to do anything that will build and sustain for their shop the name of being the best tire service station in their community. Getting this spirit into an organization is no easy task, but the successful tire dealer will not stop till he has sifted his organization down to men who are willing to work on this principle.

Here is an actual example of what I mean by the sales value to a dealer of having real service to sell.

In a certain Eastern city a fleet owner

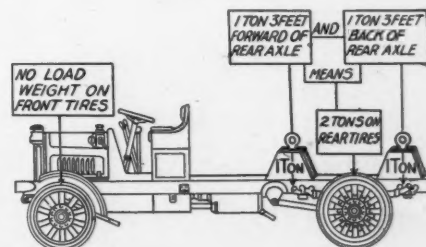
with twelve Autocar trucks was ready to make his annual contract for tires for his fleet, and the competition narrowed down to two dealers, one a jobbing dealer without service facilities, who offered the tires at \$100 each, and the other a truck tire dealer equipped to give first-class service, whose figure was \$115 per tire. The difference of fifteen dollars per tire on a fleet of twelve trucks was some item, yet the tire dealer with the service landed the order. Here's how he did it:

#### Cash in on Your Service

He showed the fleet owner that the extra cost amounted to but five cents per tire per day insurance, insurance that made certain for the owner prompt service every time a truck of his was in need of it. He showed this owner where a truck disabled with tire trouble, and without his kind of reliable service to put it on the road again, would very quickly eat up in lost profits the slight extra cost per tire that he was asking.

And he was able to sell the fleet owner on the fact that he would actually **save** money in the long run by buying his tires at \$115, rather than by taking the jobber's tires at \$100. This took real salesmanship, of course, but that is something that every truck tire dealer must have if he is to succeed.

Salesmanship does not consist in merely knowing the quality, sizes, prices, etc., of the tires one sells; it means being



able to show every prospect in a convincing manner just why he will save money by using your tires and your service, even though the first cost may be greater than your competitor's.

Many problems will be put up to the truck tire dealer for solution and he will have to use his head in solving them, for some of these problems puzzle even the experts back at the factory.

For instance, there was the case of the motor trucks being used in handling freight trans-shipment at Cincinnati, the job that the railroads have put in to thoroughly try out modern methods of handling freight at transfer terminals. Naturally, the work of motor trucks on this job, their cost of operation and all that enters into it, were watched with the greatest care, and any possible fault the operator could find with them was magnified to the limit.

#### Diagnose This Trouble

And the tires on the rear wheels of these trucks broke down continually and made a big item of expense that the truck operators didn't like to see pile up. Nor did the truck tire dealer, who had supplied the tires.

A very careful check was made of weights, distribution of loads, whether the trucks were being overloaded, etc., and the local dealer found it impossible to locate the trouble. The tires furnished were exactly the same as were being used successfully in other cases where the loads were as great, and it looked for a time as though the tire dealer was up against a stone wall.

So he called for help from the factory and the truck tire sales manager went down to Cincinnati to see if he could locate the trouble.

Here is what he found:

Checking up on weights he found that the tires were fully adequate to carry the weights theoretically given them to carry, but—

The trucks were all fitted with demountable bodies, of steel, and no allowance had been made for the extra weight of these heavy bodies, and of the heavy operating apparatus that was mounted on the truck frame for moving the bodies on and off the truck. This extra weight was sufficient to prove too much of a burden for the tires, and just as soon as this was discovered and the proper sized tires were put on to carry the actual load, not the theoretical load, there was no more tire trouble, and the jobs have stood up satisfactorily ever since.

Here was a case where tires were held responsible for trouble that was actually incurred by another agency.

The truck tire of today is a proven institution, and when a tire of known quality and known ability to stand certain loads and conditions begins to give way long before it should, the dealer to whom complaint is made should go into

a very thorough analysis of the conditions under which the tire is being used, before he admits there is anything the matter with the tire itself. He will usually find that the truck owner is either consciously trying to "put something over" on him, or else does not realize himself just how much he is overloading or abusing the tire. And a truck tire, just like a piece of steel, or a machine, or a human being, has its known limits, and when it is forced to go beyond that limit it will break down, just like the steel or the human being.

If you tried to crush stone in a corn sheller you would expect the corn sheller to break under the strain. It is just as ridiculous to expect a tire that was built to sustain a five-ton load to stand up under an eight- or a ten-ton load.

#### Watch the "Overhang Load"

A factor in determining the life of truck tires which should always be watched carefully is the "overhang load." A tire that will stand up and give perfect service under a five-ton load properly distributed on a truck, will break down rapidly if that same five-ton load is distributed so that too much of its weight comes on the overhang of the truck frame, back of the rear axle. There is an exact formula in mathematics that will show how rapidly weight multiplies when it is given extra leverage to bear down with, and this is just what happens when weight is piled up on the overhang.

For instance, on a truck with a 14-ft. wheelbase, a ton of load bearing down on a point of the frame 3 ft. forward of the rear axle exerts a weight of only 1572

lb. on the rear tires, the other 428 lb. being carried by the front tires.

Move this ton till it bears down 3 ft. back from the rear axle on the overhang, and the rear tires then bear not only the original ton, but the weight is increased by 429 lb., nearly a quarter of a ton, through the increased leverage it exerts because it is so far out. It takes some of the weight off the front tires, because of its balancing effect on the load forward of the rear axle, but it adds this weight also to the weight on the rear tires, and it sure punishes the tires on those rear wheels.

If a ton load is put 3 ft. back of the rear axle, and another ton 3 ft. forward of the rear axle, they just balance each other; none of this load is borne by the front tires, and the entire weight of the two tons then falls on the two rear tires.

This matter of the actual relation of load distribution to tire wear is one that should be very thoroughly gone into with the truck owner when selling him truck tires, for careless drivers, or rather ignorant drivers, will cost him hundreds of dollars a year through bad loading unless they are made to see why they should distribute their loads to the most economical advantage. The average driver is willing to do the right thing if he knows what that particular thing is. He should be taught.

Not only do the tires suffer through bad loading, but the entire rear axle mechanism will suffer if the rear end of the truck is given more than its proper proportion to carry. Bad loading can be more expensive even than overloading, and it is easily avoided by a little extra educational effort.

### Continued Progress in Automotive Industry

In August, normally the lowest seasonal level in the automotive industry, sales of parts and equipment to car and truck manufacturers moved forward more than one per cent beyond the July figure.

Purchases of parts, units and equipment by automobile passenger car and motor truck manufacturers from three hundred parts and accessory manufacturers show an increase of 1.31 per cent. In July the increase was 1.68 per cent and in June the curve had shown a decrease of 15.19 per cent.

During August, the automotive industry also showed betterment in two other fundamental respects—the total past due accounts decreasing 17.06 per cent and the total of notes outstanding dropping 5.30 per cent.

The percentage changes for the last eight months follow:

#### Comparative Figures for 1921

Month	Per cent Change*	Per cent Change**	Per cent Change***
February	66.15 Inc.	17.07 Dec.	39.08 Inc.
March	93.30 Inc.	16.57 Dec.	16.38 Dec.
April	32.93 Inc.	4.49 Dec.	5.94 Inc.
May	00.13 Inc.	15.64 Dec.	16.77 Dec.
June	15.19 Dec.	4.79 Inc.	10.37 Dec.

July . . . . 1.68 Inc. 10.79 Inc. 7.90 Dec.  
August . . 1.31 Inc. 17.06 Dec. 5.30 Dec.

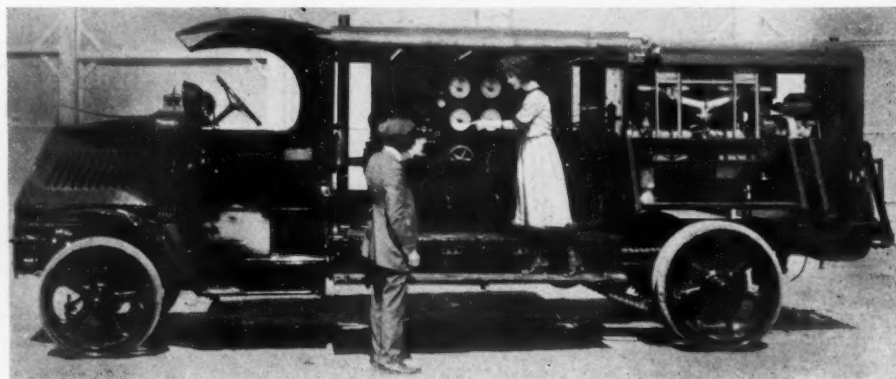
\* Purchases of parts, units, equipment, etc., by automobile passenger car and motor truck makers from 300 parts and accessory manufacturers by months—per cent change.

\*\* Totals of past due accounts reported—per cent change.

\*\*\* Totals of notes outstanding—per cent change.

### U. S. Truck Smiles and Fights

For the first four days of October the United States Motor Truck Co., of Cincinnati, O., had booked more orders and was faced with more unfilled orders on hand than during the same period for the past eight months. The firm at its regular quarterly meeting recently declared its regularly quarterly dividend of 1¼ per cent.



Portable Power Plant Used in Filming "The Cup of Life"

This plant, an electrical power plant in the Thomas H. Ince Studios in California, supplied power for 40 twin arc lights. It is mounted on a 3½ ton Mack truck and equipped with a 210 hp. Seagrave gasoline motor and directly connected to a 100 kilowatt generator. The plant, complete and ready for the field, weighs 7 tons.



# Are You a **JOY** OR **GLOOM** DEALER?

Here Are Two Interviews With Dealers  
Who Are Looking at the Truck Business  
From Directly Opposite Viewpoints

## Read What an Old-Timer Has to Say

By C. S. PERRIE

**W**HAT are you doing, Mr. Dealer and Distributor, to meet your overhead and to keep your sales organization intact during the fall and winter months?

Are you going to make a determined effort to develop business or are you going to join that class of dealers that waits for business to come to them?

Will you be spoken of in the present tense in 1922 or the past tense?

It's up to you.

Forget about the days of the "come and get it." That's history. Resign from the Pessimist Club, whose members can win but who are poor losers, and join the Optimistic and Business Boosters' Club.

The "crape hangers" are ever with us in the automotive industry as they are in other industries. These exponents of gloom not only cast a shadow over all they meet but they are largely responsible for destroying business confidence—for stopping the wheels of progress. I met one of these birds the other day when the sun was shining, one of those days when you feel full of pep and capable of sawing and splitting half a cord of wood before breakfast, even if you don't do it, or do it only mentally.

This representative of "the greatest industry on earth," to use P. T. Barnum's slogan, was seated in his office and his type must have been the inspiration of those Gloom cartoons, for when I asked how business was, he said I had a h—l of a nerve to ask what I already knew. So right then and there I handed him an honorary membership in the Pessimist Club and remarked that I knew business was not so rotten as his type said it was. I comforted this agent of gloom with the information that not 75 miles away from him was a brother dealer, selling the same line, that was still selling trucks and lots of truck equipment and that the factory sales manager was considering giving this live wire the Gloom's territory. But the only rise I got was a remark about there being no business but—the exact words

could only be printed on asbestos paper. I was mighty glad, however, to leave this exponent of the industry and get out once more in the bright, warming rays of the sun.

### Gets Down to Brass Tacks

A few blocks away I called on another dealer who admitted business was not as brisk as of yore, but this dealer belonged to the Joy class.

He knew his salesmen were not taking orders, but had to fight to sell. He also knew that intensive sales methods, involving long and arduous hours, had replaced the days of no sales resistance and that he had to work a darned sight harder than his entire sales organization. And this dealer was doing it every day, and some nights, for he realized that business was on the mend, that it was only a question of weeks or a few months before the public would be buying trucks.

Said this dealer, whose name is withheld by request, "We hear much about the period of readjustment through which we are passing and that it is responsible for the lack of truck sales. It may be a factor and one of the reasons why business is not flocking to our salesrooms, but I like to believe that approximately normal business can be developed if we truck dealers, and salesmen, and manufacturers, will forget about the last few years and realize that from now on we have a sales proposition, not an order-taking business.

### Enter the Calamity Howler

"When business slowed down, when the order taker went up against it hard, and the daily press published articles about the unemployed, what did many truck dealers do? I refer to the newer class, attracted to the industry by quick profits and without a real sales force. This class became calamity howlers. They did worse, if you please, for they fostered the spirit of 'no business,' and it is this class of pessimists that can be blamed for much of the so-called 'slump' in the truck business. And while I am using the ham-

mer, let me take a fling at the factory heads who listened to these calamity howlers and believed what they said, because dealers were not keeping the wires hot for deliveries.

"The attitude of the dealers I refer to, and some factories, reminds me of a little stunt my professor at college pulled. He said that the human being was given to exaggeration, that truth was sadly handicapped when messages were circulated by word of mouth. He called one of the students to his desk and whispered to him, then sent the student out to the hall. Another student was sent out to whom the first student repeated what the professor had told him, then came back in the class room. A third, fourth, etc., student was sent, each replacing the preceding student. Finally the last student was called in and requested to tell the class what had been told him. Then the professor gave out the information he had given the first student. It had to do with figures, but if I remember rightly they grew from a small sum to a large one which, of course, bore out what the professor had said about exaggeration. We have too many of the student class among dealers, and I guess a few of the factory heads cannot be classed among those who can be trusted when it comes to passing along cheerful news."

I remarked I saw the point of the analogy but questioned his remark about the factories. They were, I said, anxious to build business, to create confidence.

"Some are and some are not," was the reply. "My company is building confidence among the dealers, but lots are not. The case of Bill Jones across the street is an example of the lack of confidence. Bill took on the Blank truck just about the time the reaction came. Bill was hit quite hard, but being an optimist he kept plugging along, hoping to get a better break. Bill used to tell me, 'They can't always give us the worst of the breaks, Jim, because every dog has his day.' Well, his factory began retrenching. The exec-

utive who sat on the cash box was as busy as a gardener pruning a tree with the blight. They cut off the 50-50 advertising co-operation and told Bill to stand the bill. Reduced sales co-operation, service aids and a lot of other things which a dealer appreciates and needs from the factory. What they did not do was to tell Bill that they were going to give him all the help they could in a moral way. Replies to Bill's letters might as well had a black border, for there wasn't a cheer up note in the bunch.

"Oh, yes, Bill is struggling along, but it's a lone fight. Wouldn't it help a lot if Bill's factory would climb aboard the Joy wagon, spend a little time and money telling Bill and the world what a great and glorious thing motor highway transportation was, that it was first, last and always for preaching, acting and believing in the industry? What we need is the confidence of everyone in the industry, and any person who can't act and preach it ought to be thrown out. Business will begin when we make it start and it isn't going to be started by waiting for George to do it, but by everybody doing it. And right here I want to congratulate THE COMMERCIAL CAR JOURNAL for preaching confidence and business sales methods in the truck industry."

The dealer interviewed is noted for his candid opinions. To change the subject I asked if he was keeping his sales organization intact, if he had made any changes in his policies or in his sales force.

"I am keeping my sales organization and other departments intact. My overhead kept working right along and I found that it was getting a few laps ahead of the profits. After carefully analyzing the overhead of the different departments I came to the conclusion that I would call in, and separately discuss the matter with each department head and his subordinates. The first meeting was with the sales force, wholesale and retail. I went over the overhead, sales, costs, profits, etc., of the past year and pointed out

that conditions required retrenchment if I was to continue in business. There were some long faces pulled at this remark and some had visions of the good-by ticket on pay day. I remarked that retrenchment and salary reductions were the most popular indoor sports in every line of endeavor, but I wasn't going to cut any salaries or commissions—YET. I just put it up to the boys that we had worked shoulder to shoulder and built up a reputation for a square deal house and that I did not propose to see the sheriff come around and nail up the doors. We could keep that unwelcome party away if every man in the organization would realize that it will take darned hard work, and plenty of it, to keep the boat on an even keel. 'Boys,' I said, 'it is up to you whether we sink or swim, whether your name is on the pay roll or not. I'm with you and will work as hard as any of you, and if my plan meets with your approval, let's go.'

"Did it go over? It did. Right then and there we discussed every angle of the times and planned a campaign, also to hold weekly meetings. The plan has been successful, for every salesman, with the exception of two, pledged co-operation. It was suggested that a sales board be employed and every man's record, calls, sales, etc., be posted so that the slackers would be shown up.

#### Why the Star Salesmen Fell Down

"I had a couple of what you might call star salesmen—good mixers and a large acquaintance. Played good golf and belonged to social organizations. One had a good stock in his cellar when the dry spell set in. They took lots of orders in the old days and with short working hours. You know the type. Well, these two got so soft and flabby that they just couldn't set their alarm clocks for earlier than 9 A. M. or cut their lunch from two hours to thirty minutes, so they dropped into the second division in a few weeks and soon were fighting it out for last place. The boys hinted that the blue

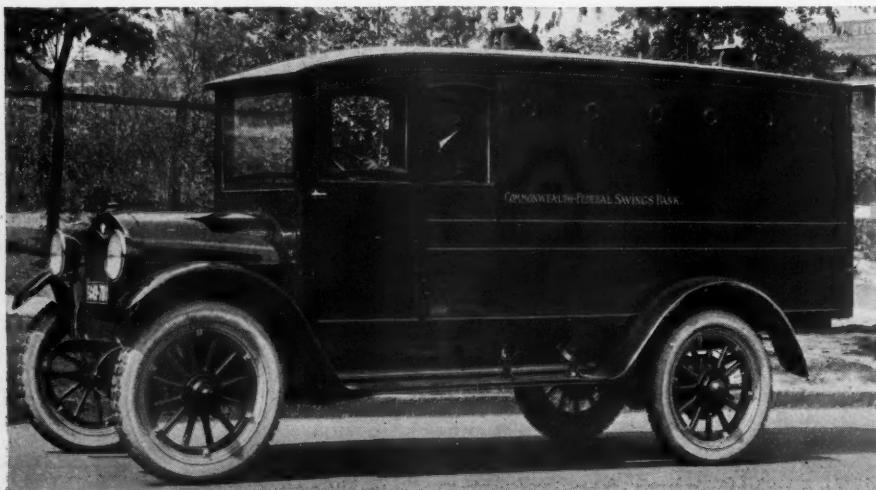
ticket was theirs, but after a talk I gave them another trial. No results, and they departed for other fields.

"I adopted the same methods with all of the departments and found that the incompetent eliminated themselves. While I did not reduce my overhead I did get greater efficiency and more business. Competition arose in each department to increase production and lower costs, and as a result my net profit is some per cent better than a corresponding period. One advantage of the plan has been that the real capable men who slacked off because of easy conditions got back into their stride and are delivering value for money received. I'll admit that some of the sales force got mighty discouraged the first few weeks, but when I noted the signs I had a heart-to-heart talk with them and with the two exceptions mentioned all are still selling trucks. Of course I realize it takes real sand to stick to a job that pays small in comparison to the old days, but the boys that stick are the ones that will cash in when the business reaches its peak and that will be long. My door is always open to any of my employes and we are like one big family. As to being busy myself, see that bunch of golf sticks in the corner? Well, I was presented with that outfit last winter and have used them but once. Do I love golf? I sure do, but the game will still be played when I am able to steal a few hours off, but that will not be this fall and probably not until next summer."

At this point the service manager entered with a bunch of papers and a look of determination on his face. Much as I would have liked to remain and hear the fireworks, courtesy required my absence, so I bid the dealer good day and walked out into the sunshine.

How much better would the truck industry be if it was represented by dealers like Jim?

And wouldn't we get back to real business much faster if we all started and did not wait for George to do it?



#### Bullet-Proof Reinforcements Convert This Otherwise Stock Babcock Panel Body Into a Veritable Fortress

The attention of bankers, during these days of rapidly recurring robberies, is being focussed on protective measures such as illustrated above. The Commonweath Federal Savings Bank, of Detroit, in acquiring this job and special bank body, has not only greatly reduced the robbery hazard, but has increased the confidence of its patronage by demonstrating a desire to safeguard their money in every way possible. It has advertising value. Except for the complete interior bullet-proofing, consisting of specially treated, 10-gage steel, and shutters of same material, which can be made to envelop the entire driver compartment, it is a standard, stock Babcock Panel Body, manufactured by the H. H. Babcock Co., Watertown, N. Y. The shutters, when not in use, fold up into the roof. The portholes provided in both sides of the body, are for the use of weapons in case of attack. Ventilation is provided by special openings through the roof.



# Turnover of Merchandise and Control of Stock

*Knowing WHAT is Taking Place WHILE It is Taking Place*

**N**EXT to cost accounting the most important factor in the science of successful business is a rapid turnover. In fact, they are inseparably allied. A thorough study of the subject of turnover was recently made by the Domestic Distribution Department of the U. S. Chamber of Commerce in effort to bring before American business, both in the retail and wholesale branches, positive facts on better business methods.

It seems that the greatest evil practiced by American business men, is a violation of the most fundamental principle of rapid turnover—overbuying. The reasons for this tendency are manifold and apparently logical. Hence, the violation is universally flagrant, even among comparatively progressive merchants, and consequently, universally penalized by poor or complete loss of profits. Better business methods demand observance of certain iron-clad rules found correct by economists, who have studied the phenomena of business exhaustively.

The advantages of rapid turnover in business are brought out vividly in an illustrated booklet just issued by the Domestic Distribution department. This fundamental principle of merchandising is emphasized in connection with a suggested plan of stock control records designed to reduce waste and losses, due to slow movement of goods.

The department calls attention to seven separate directions in which losses may occur when merchandise is not turned

over as rapidly as it might be. These are in investment, interest, mark-down, salaries and wages, shelf and storage room, prestige and reputation and efficiency. Taking up these elements of loss in detail the booklet says:

"Invested money is the source of profit which in turn depends upon the amount of goods in stock and upon the length of time which these goods are carried. It is evident that to double the turnover comes to the same thing as doubling the amount of the stock without in any way increasing the investment. Or, vice versa, one-half as many turnovers results in doubling the amount of money generally invested for the same quantity goods.

"Interest must be paid upon all borrowed money and most merchants are borrowers. If the turnover is reduced from a period of six months to one of three months the interest on a given loan is reduced in the same proportion.

"Mark-downs are required for three principal reasons:

1. The goods have proved unsalable at the original mark-up.

2. Too many were bought and a change in the style or season left some of them on the shelves—

3. With the result that they have been soiled, chipped, bent or defaced otherwise by frequent handling.

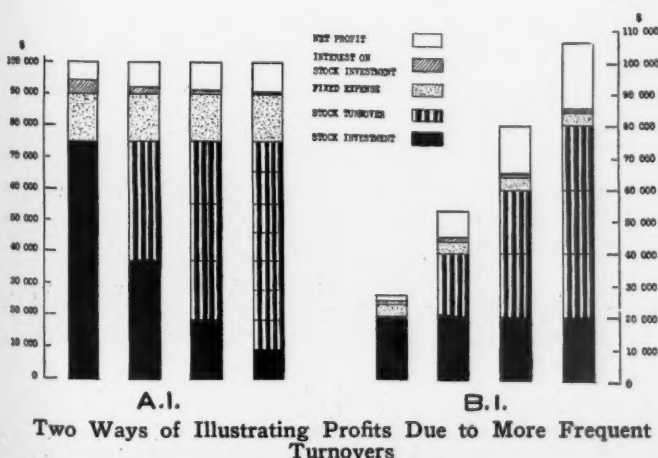
"Salaries and wages must be included, because every operation in every establishment costs something. When an unprofitable operation is performed it represents a loss. These

losses are due to the following reasons:

1. Waste of time by management in reaching decisions as to when and what mark-downs are to take place.
2. Waste of time by sales force.
3. Rewriting tickets.
4. Rearranging goods for mark-down sales.

STYLE	BOUGHT FROM	DESCRIPTION	MATERIAL
101	American Leather Co.	Pan. Belt	Leather
COST \$2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30		
102	RECD		
	O.H. 10		
	SOLD 5 7 8 1	3 5	
	O.O. 15		
103	RECD		
	O.H. 8		
	SOLD 4 1 1 1	3 5	
	O.O. 15		
	RECD		
	O.H.		
	SOLD		
	O.O.		
	RECD		
	O.H.		
	SOLD		
	O.O.		
	RECD		
	O.H.		
	SOLD		
	O.O.		

A Form of Control-Card Which Shows at Any Moment the Condition of the Stock and the Rate at Which It is Selling



Series A proves the decreased investment needed to perform a given amount of business while Series B proves the increased business and profits which accrue to the same investment upon a multiplied turnover

"Shelf or storage room is a definite part of the expense of doing business; and that portion which is devoted to slow-selling merchandise is wasted.

"Prestige-Reputation—for the high character or timeliness of merchandise is sought by most stores. There is a distinct waste measurable in dollars and cents when the reputation of an establishment is lowered by unstylish or shopworn goods.

"Inefficiency always results in waste. The buyer whose judgment often is wrong usually makes the mistakes from lack of knowledge as to the stock and the speed or slowness with which it is moving. Frequent mistakes cause uncertainty in the mind of the one who makes them and tend to worse errors as time goes on unless some measures are taken to make them improbable.

"There is just one method of reducing this waste to a minimum. That is through records of purchases and sales which can be consulted at any moment; which will give a complete picture of the situation as it changes from week to week, from day to day, etc.; and which will supply the knowledge for immediate additional purchases, for mark-downs or for any other change in handling the stock."

The booklet gives two graphs, one of which illustrates a form of control card record that has been successfully used.

The Department urges, first and foremost, the division of an establishment into departments as a means of making the keeping of records easier, and as the only method by which unprofitable departments may be reorganized intelligently.

After the departmental plan has been arranged an inventory must be made on the control-cards which are designed to exhibit every necessary fact for every day in the month.

A sample card is shown, but the exact shape and size will differ somewhat with the department or kind of business involved. The idea is adapted to the most widely differing merchandise.

"In a certain establishment the direct cost of this method of stock-control," continues the booklet, "has amounted to less than 1 per cent of the selling price. Yet it has increased the turnover considerably in all of the departments where it has been applied; and in the department where it was first installed the turnover has nearly doubled while the mark-down wastes have been more than cut in two. Not only has the number of turnovers increased but also the amount of merchandise sold in each turnover. Errors in the judgment of buyers have been made less

probable in the future as the causes and kind of errors have been made clear. Last but not least, a record of the remarks by customers shows the enhanced reputation of the stock.

"These cards constitute a perpetual inventory which displays at a glance every factor in which the management and the buyer may be interested: At what rate the goods are selling; which sizes are selling fastest; which styles are most popular; when it is time to order more; and which of the goods must be marked down. They are under the charge of one person who makes all of the entries and are mounted in an open rack. Probably the most remarkable characteristic of the control-card is the fact that changes are recorded within a quarter of an hour after they take place, so that those in authority, if it is necessary, may know the precise condition of the whole stock at any hour of the day.

"From this description it is evident with what certainty and rapidity judgments may be formed and policies may be altered."

In order to reap the benefit of the information collected in the form of figures on the control-cards, the booklet points out that there remains the necessity to condense the figures which they display in the form of a report.

"Without these reports the management

fails to secure the benefits endowed by the control-cards and the chance for immediate action is lost. Opportunities for a profitable change in policy may come suddenly and if not taken advantage of at once may disappear as quickly as they come. Control-cards are largely to provide for these sudden changes which a wide awake merchant can convert from a loss into a profit only if he has before him a picture of what is taking place.

"Two forms of report are needed:

(a) Slow-selling Merchandise.

(b) Quick-selling Merchandise.

"These will be considered separately because they relate to problems which are entirely distinct from each other.

(a) Slow-selling merchandise must be recognized immediately in order that the mark-down shall not be delayed beyond the proper moment and to ensure that future purchases of that class shall be made with more caution.

(b) Quick-selling merchandise should be emphasized in the minds of those who are responsible for buying and this can be done only through visualizing what has taken place by means of the actual figures and dates."

Copies of the booklet may be had by application to the Chamber of Commerce of the United States at Washington.

## The Industry Needs Good Salesmen

Investigation Shows That Dealers Want Salesmen Who Are Willing to Mix Brains With Hard Work. Green Hands Preferred Because They Can be Trained and Because They Are Not Full of Pessimism

**T**HE scarcity of good salesmen, as reported in New Orleans and several other sections of the country, prompted an investigation on the subject among the large truck dealers. Although a dearth in good selling men had been noted in various industries, it was thought that the automobile industry, and particularly the truck industry, had not suffered in this respect.

For the past few years the automobile salesmen problem has been just like the servant problem, always a thorn in the side of the truck industry. As one dealer very aptly stated, "Salesmen are like cantaloupes—you must try many before you get a good one." The success of many a dealer organization has rested on the calibre of the salesmen.

The war period undoubtedly created an abnormal condition in the salesmen field. Selling was easy. Many salesmen were needed and where the demand could not be supplied, laymen were broken in to the secrets of truck selling. Many of these men were selling motor vehicles for just two reasons—the facility of truck

sales at that time and the large commissions. No enthusiasm for the automobile industry prompted their work. That class of obstacles to progress, "the floater," crept into the selling field.

As the depression made its appearance and retrenchment began among the dealers, these men were the first to go. Others, retained for various reasons in this class, finding that hard work was the order of the day, sought other fields of endeavor.

In a way, the depression was an excellent thing for the industry—it purged the field of inefficient salesmen. But many of the good salesmen have left, whose departure will be felt most severely when truck selling is back on a normal basis.

A sales manager of one of the leading distributors of Philadelphia recently said that he has not had an application for a salesmanship position during the past month. On the other hand, he has received numerous inquiries throughout the State for good men.

One dealer, upon advertising for truck salesmen last month, received five appli-

cations in one day. Two men, old truck salesmen, proceeded to inform the dealer that the truck market today was "terrible;" that nowadays a truck sale was a physical impossibility. After listening to five minutes of "deep gloom" the dealer showed the two applicants the door.

Why should I employ men who admit defeat before they even start work?" he told a member of his staff. Two other applicants for the position began at once to talk salary. Their demands made the dealer forget for a time that the war period had passed. They made the consideration of their applications impossible.

At the present time, dealers seem to prefer a green man to an experienced truck salesman. A green man, with real selling ability, can be taught the company's methods very quickly and does not carry the "pessimism" that has permeated the selling ranks of the truck field.

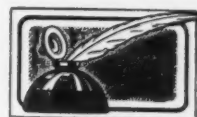
A salesman of a commodity other than a motor vehicle is often excellent material. Selling is selling in every walk of

(Continued on page 69)





## EDITORIALS



### Are Instalment House Methods Practical?

THE activities displayed by the motor truck industry in endeavoring to bring truck prices to a level conforming with present day lower price tendencies is commendable. Practically all of the prominent manufacturers have reduced their prices and further reductions may be expected in some quarters during the coming winter or perhaps next spring. A few are still sticking to prices which are far above the average asked for the same sized units offered by their competitors.

Price reductions alone, however, will not solve the sales problem. Simply announcing a new price will not guarantee the truck builder an increased production schedule. It helps a great deal undoubtedly in overcoming one of the chief contingencies on which most sales seem to be consummated these days. A little analyzing, however, should convince the manufacturer and the dealer that, given a price which is fair for his product and in conformity with his competitors' products, the remainder depends entirely upon the inherent quality of his product, its usefulness to the consumer, the service it will render, reputation of the manufacturer, salesmanship displayed, etc. In other words, the popular advertising phrase, "the quality will be remembered long after the price is forgotten," should be the principle upon which the sale of every motor truck should be executed. Price should never be the first consideration in the sale of any article. The experienced salesman usually keeps this until last.

Therefore the price of any article should not simply be the means to an end, as in the case of a truck manufacturer who first of all announces a price reduction and at the same time offers to sell his truck at nothing down and a year to pay. We cannot conceive how a truck manufacturer can expect to interest a prospect when he believes its value by offering to sell it without at least a small deposit. Furthermore, such a proposition is not destined to attract the best class of customers. Any manufacturer or dealer who sells under such a policy is only helping to increase the number of used trucks on the

market. He will wake up some morning and realize that he has been hiring trucks to his customers instead of selling them. Hasn't the "pay as you earn" policy caused enough damage to the truck industry, because trucks were purchased by individuals who hadn't enough business acumen to make them pay after they got them?

Even the modern installment house extracts enough cash at the time of sale to nearly pay the cost of the articles purchased. Does the average merchant, in any line of business, offer to sell two or three thousand dollars' worth of goods to a customer with a year's time to pay? He doesn't try to force sales that way. His own common sense tells him that he cannot continue in business and hope to build up a reputable clientele with such merchandising policies. It is not our purpose to depreciate time payment or financing plans of any legitimate sort, but we cannot see the wisdom of selling trucks without at least obtaining a fair sized deposit with the order, the greater amount—the better.

### We Say It Can be Done

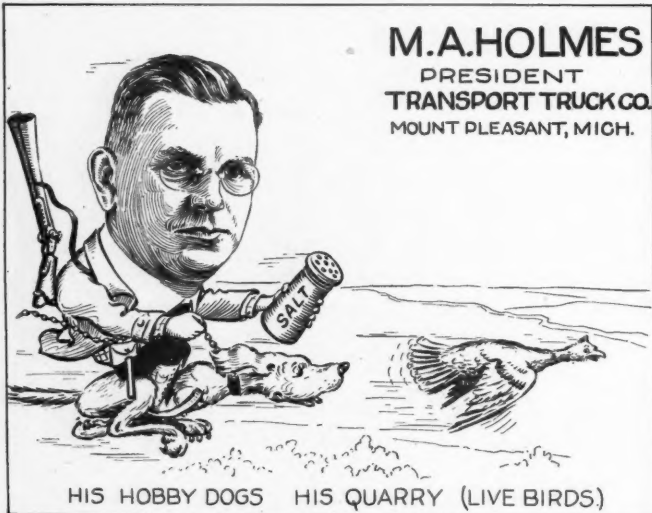
THIS publication has repeatedly advocated within the past two years that the truck dealer can increase his profits by selling truck equipment. The line he should carry depends entirely upon his territory and the conditions under which most of his trucks operate. His market in this field is not limited to his own line of trucks, but extends to competitive makes. As a matter of fact, however, the average dealer is reluctant to enter the equipment sales business. Naturally he has a reason for side-tracking this remunerative field, because selling the complete chassis was more profitable.

The lessened demand, however, for trucks has caused many dealers to consider the sale of truck equipment more seriously, so that we feel that the leading article on "Selling Winter Equipment" in this number, is most timely and that it will give those dealers who are considering this field some concrete information on the establishment of a Truck Equipment Department.

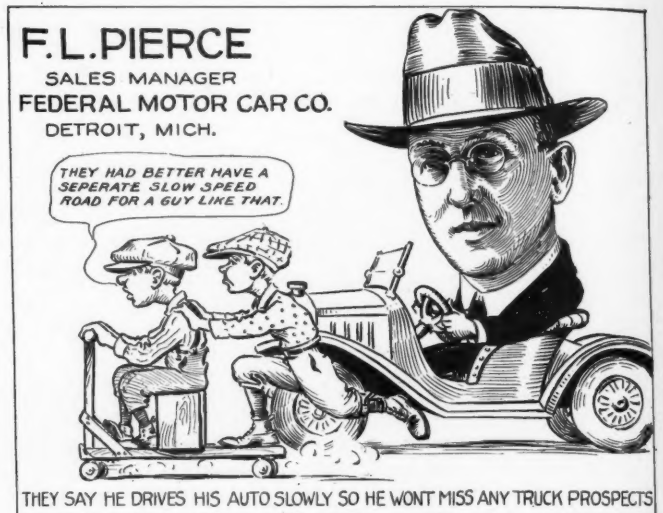
**WINTER MEANS BUSINESS!**  
**ARE YOU PREPARED TO GET YOUR SHARE?**



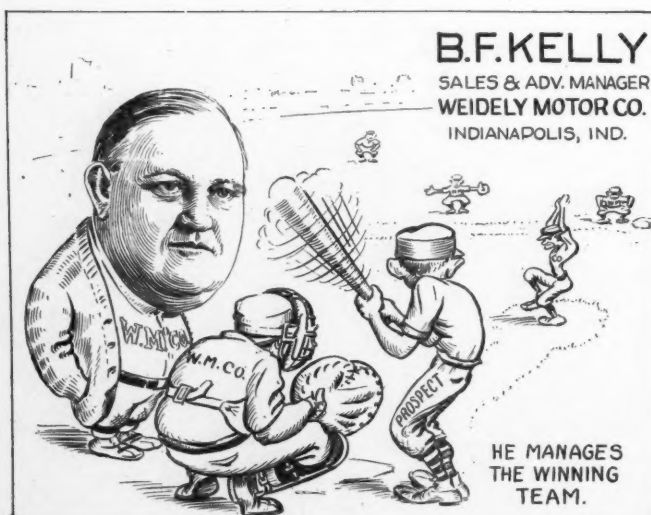
## FRIENDLY TIPS ABOUT SOME "BIG ONES"



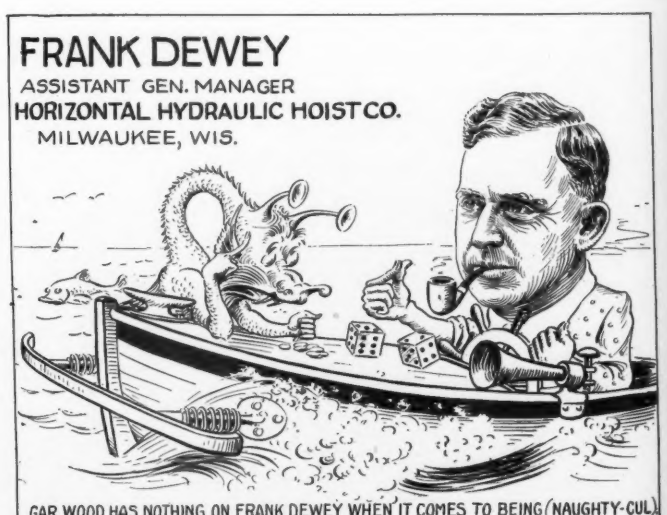
**M. A. Holmes**—Born in Horton, Mich., 1879. After leaving school entered the retail farm implement and carriage business. Spent four years with American Seeding Machine Company of Springfield, Ohio, as commercial traveler, two more as District Manager and two additional years as special representative in the jobbing business for this company. For two years he was General Sales Manager of the Republic Motor Truck Company, and for two more Vice President and General Sales Manager. About three years ago Mr. Holmes organized the Transport Truck Company, Mount Pleasant, and since that time has been its President and General Manager.



**F. L. Pierce**—Has been identified with automobile industry for about fifteen years. Prior to present connection was with Regal Company for nine years. Three years ago became connected with the Federal Motor Truck Company, Detroit, as Sales Manager, which position he still holds.



**B. F. Kelly**—Born 1888 at Indianapolis. Entered automobile business with local Buick agency in 1907. Then went with the old Overland Auto Company, Indianapolis, as Assistant Purchasing Agent. Then went to Willys-Overland Company, Toledo, as Purchasing Agent in 1909. Next position was with National Acme Company of Cleveland, and after a number of years went to look after the interests of Bernard E. Griffey Supply Company of Indianapolis, of which concern he is President. In May, 1919, went with Weidely Motors Company as Director of Sales. Mr. Kelly also organized the Parts Corporation of Indianapolis, of which concern he is Vice President and General Manager.



**Frank Dewey**—First took course in mechanical engineering, Virginia Polytechnic Institute. Then became associated with American Tobacco Company and American Planograph Company, New York City, on special machinery designing. Attached to navy yards several years, first California, then Norfolk Navy Yard, designing ordnance material, especially gun turret machinery, later developing, testing and manufacturing naval defense mines. Later joined Packard Motor Car Company and organized truck special equipment department. Then joined Horizontal Hydraulic Hoist Company, establishing the Detroit branch. At present is Assistant General Manager of above company, located at the factory, Milwaukee, Wis.



# News of the Trade in Brief

## War Time Waste Still Clogs Trade, Says Moock

CINCINNATI, O., Oct. 3—Not more business but better methods was the chief subject discussed by Harry G. Moock, general manager of the National Automobile Dealers' Association, with headquarters at St. Louis, Mo., who was the guest of the Cincinnati Automobile Dealers' Association at the October trade revival meeting here.

Mr. Moock declared that concentrated effort in locating waste resulting from extravagant habits contracted in the hilarious days following the war would result in amazing developments if merchants would make close examination. This, he said, applied not only to the automobile

dealer, but also to all other merchants.

Better service, not the mere desire to use the term to attract attention, but courteous, prompt, economical attention to the customer's wants will do much toward establishing good will and character building in business; without which no business house can succeed.

Speaking of the legislative and tax situation, both nationally and state-wide, he stated that the taxes paid by the automotive industry, based on the 1920 compilations, amounted to the enormous sum of \$366,720,878. In fourteen states, however, there is now a gasoline tax being paid by motorists, adding to the already heavy burden some \$6,000,000. The greater the tax the greater the sales resistance.

## Three Steel Companies Consolidate

Steel mill properties with combined assets in excess of \$20,000,000 have been brought together in the merger just completed of the Central Steel Co., the National Pressed Steel Co., and the Massillon Rolling Mill Co., all of Massillon, O.

The new corporation, it is announced, takes the name of the Central Steel Co., and the following officers have been elected: Chairman of the board of directors and president, R. E. Bebb; 1st vice-president, F. J. Griffiths; 2nd vice-president, C. C. Chase; 3rd vice-president, H. M. Naugle; secretary and treasurer, C. E. Stuart.

The firm will be in a position to do extensive work for the automobile industry.

### SHOWS

October 15 to 22, 1921—St. Louis, Mo. St. Louis Automobile Exposition, auspices of St. Louis Auto Mfgs. and Dealers' Assn., Chevrolet Motor Co. Bldg. (125,000 sq. ft.). Passenger Cars, Trucks, Used Cars and Accessories. Robert E. Lee, Mgr., 3124 Locust St.

October 17 to 22, 1921—Jackson, Miss. Automobile Show at the 18th Annual State Fair, Auto Bldg. and tents. Mabel L. Stire, Box 55, Sec.

October 18 to 21, 1921—Raleigh, N. C. Automobile exhibit at the 60th Annual State Fair at Fair Grounds, auspices of North Carolina Agricultural Society. Passenger Cars, Trucks, Tractors and Accessories. Jos. E. Pogue, Sec., Raleigh.

November 11 to 19, 1921—Little Rock, Ark. Fourth Annual Show, auspices of Arkansas Automotive Assn., State Fair Grounds. Passenger Cars, Trucks and Accessories. A. W. Parke, P. O. Box 699.

November 14 to 19, 1921—Jersey City, N. J. 2nd Annual Jersey City-Hudson County Automobile Show, at the 4th Regt. Armory, under auspices of Hudson County Automobile Trade Assn. Passenger Cars, Trucks and Accessories. Fred W. Payne, Mgr., 342 Madison Ave., New York City.

November 14 to 19, 1921—Chicago, Ill. Annual exhibit of the Automotive Equipment Assn., at the Coliseum. Accessories and Equipment.

November 28 to December 3, 1921—Des Moines, Ia. Fourth Annual Tractor Show, auspices of Iowa Implement Dealers' Assn., at Coliseum. Trucks, Tractors and Power Farming Machinery. T. F. Wherry, Mgr., 664 38th St.

January 7 to 14, 1922—New York City. Annual Automobile Show of the National Automobile Chamber of Commerce, at Grand Central Palace. Passenger Cars and Accessories.

January 9 to 20, 1922—New York, N. Y. First Annual Retail Dealers' Auto Equipment Show, at Hotel Imperial, auspices of National Retail Merchants' and Buyers' Assn. Accessories and Automobile Clothing. George T. Keen, Sec., Hotel Imperial.

January 19 to 25, 1922—Milwaukee, Wis. Annual Automobile Show of the Milwaukee Automotive Dealers' Assn., Auditorium (100,000 sq. ft.). Passenger Cars, Trucks and Accessories. Bart J. Ruddle, 316 Brumler Bldg.

January 28 to February 3, 1922—Chicago, Ill. Annual Automobile Show of the National Automobile Chamber of Commerce, at the Coliseum.

January 30 to February 4, 1922—Minneapolis, Minn. National Tractor Show, held annually.

January 30 to February 4, 1922—London, Ont., Canada. Second Annual National Motor Show of Western Ontario, Armory and temporary buildings, auspices of Automotive Retailers' Assn., London, Ont. Passenger Cars, Trucks, Tractors, Accessories, Motor Cycles and Bicycles. T. C. Kirby, Tecumseh Hotel.

### Coming Events

February 3 to 10, 1922—Minneapolis, Minn. Fifteenth Annual Automobile Show, auspices of Minneapolis Auto Trade Assn. Passenger Cars, Trucks and Accessories. W. R. Willmot, 709 Andrus Bldg., Minneapolis.

February 6 to 9, 1922—Scranton, Pa. Annual Truck Show, under the auspices of the Scranton Motor Trades Assn., Armory (50,000 sq. ft.). Hugh B. Andrews, Mgr., 411 Board of Trade Bldg.

February 6 to 11, 1922—Winnipeg, Canada. Second Annual Automotive Equipment Show, auspices of Western Canada Automotive Equipment Assn., Board of Trade Bldg., Auditorium. W. L. Williams, New Stovel Bldg., Winnipeg.

February 11 to 18, 1922—San Francisco, Cal. Sixth Pacific Automobile Show, auspices of Motor Car Dealers' Assn. of San Francisco, at Exposition Auditorium (70,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. G. A. Wahlgreen, 215 Humboldt Bank Bldg., Mgr.

February 14 to 17, 1922—Philadelphia, Pa. 21st Annual Exhibit and Convention of the Pennsylvania and Atlantic Seaboard Hardware Assn., Inc., at the Commercial Museum. Automobile Accessories, etc. Sharon E. Jones, Sec., 1314 Fulton Bldg., Pittsburgh, Pa.

February 20 to 25, 1922—Duluth, Minn. Seventh Annual Show of Duluth Auto Trade Assn., Duluth Armory Bldg. (70,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories.

February 20 to 25, 1922—Deadwood, S. Dak. Tenth Annual Black Hills Auto Show of the Deadwood Business Club, Auditorium. Passenger Cars, Trucks, Tractors and Accessories.

February 20 to 25, 1922—Louisville, Ky. Fourteenth Annual Automobile Show, Jefferson County Armory (64,000 sq. ft.). Passenger Cars and Accessories. George T. Holmes, Inter-Southern Bldg.

February 27 to March 2, 1922—Bethlehem, Pa. Seventh Annual Truck Show of Bethlehem Auto Trade Assn., Coliseum. Trucks, Tractors and Accessories. J. L. Elliot, Mgr., 1308 Norway Pl.

February 27 to March 4, 1922 (tentative date)—Atlanta, Ga. Second Annual Great Southern Automobile Show, auspices of Atlanta Automobile Assn., Auditorium Armory. Passenger Cars, Trucks and Accessories. Virgil W. Shepard, 305 Connolly Bldg., Show Mgr.

March 11 to 18, 1922—Boston, Mass. Twentieth Annual Automobile Show of the Boston Automobile Dealers' Assn., Mechanics Bldg. (125,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. Chester I. Campbell, Mgr., 5 Park Sq.

### CONVENTIONS

Atlantic City, N. J., October 19 to 22, 1921—Fourth Annual Meeting and Exhibition of the Automobile Accessories Branch of the National Hardware Association of the United States, at the Million Dollar Pier. T. James Fernley, Sec., 505 Arch St., Philadelphia, Pa.

Chicago, Ill., November 14 to 19, 1921—Annual Convention and Business Exhibit of the Automotive Equipment Assn., at the Coliseum.

Chicago, Ill., January 17 to 20, 1922—Annual Convention and Exhibit of the American Road Builders' Assn., at the Coliseum. Address Sec., 11 Waverly Pl., New York City.

Chicago, Ill., January 30 to 31, 1922—Fifth Annual Convention of the National Automobile Dealers' Assn., La Salle Hotel.

Cleveland, Ohio, October 18 to 20, 1921—Convention and Exhibit of the National Tire Dealers' Assn., Hotel Winton.

Columbus, O., December 14 to 16, 1921—Fifth Annual Convention and Exhibit of the Ohio Automotive Trade Assn., Memorial Hall and the Elk's Home. E. J. Shover, Sec.-Mgr., 403 Central National Bank Bldg., Columbus.

El Centro, Calif., October 17 to 18, 1921—Southern Division Meeting of the California Automobile Trade Assn.

Elkins, W. Va., November 8, 1921—Semi-Annual Meeting of the West Virginia Automobile Dealers' Assn.

Greenville, S. C., December, 1921—Semi-Annual Meeting, South Carolina Automotive Trade Assn.

New York, N. Y., January, 1922—Final Meeting of the Automotive Wood Wheel Manufacturers' Assn.

New York, N. Y., November 22, 1921—Convention of the Factory Service Managers, National Automobile Chamber of Commerce. Address, Marlin-Rockwell Bldg., Madison Ave. & 46th St., New York City.

New York, N. Y., January 11 to 14, 1922—Annual Meeting of the Society of Automotive Engineers, Engineering Society Bldg.

Oakland, Calif., October 24 to 29, 1921—International Traffic Officers' Assn. Convention.

Trenton, N. J., May, 1922—Annual Convention of the New Jersey Automotive Trade Assn. H. S. Moore, Sec.-Treas., Trenton.

### FOREIGN EVENTS

Brussels, Belgium, December 3 to 15, 1921—Annual Belgian Automobile Show.

London, England, October 13 to 23, 1921—Olympic Commercial Car Show.

Santiago, Chili, March, 1922—Annual Automobile Show.

Shanghai, China, November, 1921—First Annual Automobile Show.

### Service Movement Grows During Year

Seven new automotive service associations have been formed during the past year with the aim of promoting the welfare of the car owner by raising the standards of repair work and by discouraging service stations that engage in unfair practices.

The growth of motor transport to a point where over 9,000,000 vehicles are on the road, has called for a corresponding increase in the science of the care of these vehicles. Certain individual companies have developed an efficient service policy, but local co-operation of service men for the sake of maintaining standards is comparatively new.

Service station men have found it desirable to have an association which will fight the irresponsible repair shop whose sole interest is to "gyp" the public. The shop of unfair standards can make unnecessary repairs, use inferior parts and indulge in other practices immediately profitable, but in the long run damaging to the entire business. If any one service man protests against such practices by a rival he is likely to be accused of trade jealousy. A service association, however, can help protect the public and the good name of the trade.

Service associations also make for efficiency in repairs. They permit a study of the local situation and the exchange of ideas on economical repair methods.

The seven new associations formed this year are: Worcester and Springfield, Mass.; Syracuse and Buffalo, N. Y.; Hartford, Conn.; Pittsburgh, Pa., and Charlotte, N. C. Other associations already established are: Automotive Service Association of Baltimore; Automotive Service Association of Brooklyn; Automotive Service Association of Denver; Automotive Service Association of Indianapolis; Northwest Automotive Service Association, Minneapolis; Automotive Service Association of Newark; Automotive Service Association of New York, N. Y.; Motor Maintenance Association, Omaha, Neb.; Kings County Automotive Trades Association, Seattle, Wash.

### August Truck Exports Show Increase

Truck exports were slightly higher in August over those of July, according to Domestic Export bulletin compiled by the Bureau of Foreign and Domestic Commerce. During August the U. S. shipped 241 completed cars, valued at \$268,691, and 140 chassis at \$165,361, while July exportation shows 204 finished cars, at \$177,247, and 135 chassis at \$136,990. Mexico again leads the field, having received in August 98 completed trucks costing \$75,831 and 33 chassis at \$17,820, with Canada second with 50 finished and 39 unfinished trucks. England is third with 37 completed and 12 uncompleted trucks. This is an increase for England for the month of July shows no completed cars and only ten chassis received.

### Bosch Has Big New Building in New York

The new Bosch Building, which stands at 17-19-21-23 West 60th Street, Columbus Circle, has ten stories and mezzanine, and is thoroughly modern in every detail. It is of fireproof construction, being built of steel, stone and concrete throughout.

The American Bosch Magneto Corporation will occupy four complete floors, their quarters constituting perhaps the most elaborate automobile electrical sales and service station in the United States. A large service station and installation garage will be located in the basement, and the sales and stock room, which will occupy the ground floor, will be spacious and especially well laid out, with high ceilings and large show windows. Part



**New Bosch Building**

Located in the heart of the automobile district of New York City. Devoted strictly to automotive affairs

of the service equipment in this building is a truck elevator which is one of the largest and most powerful automobile lifts ever built.

It is the intention of the Corporation to rent the upper floors of the building exclusively to automotive concerns and retain an atmosphere of motordom throughout the handsome structure.

### Black & Decker Introduce Credit Plan

A national credit system, making it possible for any reliable person in the United States and Canada to purchase electric motor-driven shop equipment on six-months terms without any extra cost has been introduced by the Black & Decker Mfg. Co., Baltimore, Md., makers of portable electric drills, grinders, etc. Black & Decker products are sold entirely through jobbers, and the new service enables customers to pay 23 per cent of the regular price of the item in cash and the balance in six monthly payments.

Jobbers are furnished with printed forms which are conditional sales agreements. The drill company will accept half the responsibility with the jobber for the fulfillment of the sales agreement.

### Uniform Laws Will Curb Truck Hazards, Says Fenner

BOSTON, MASS.—Motor truck transportation can be made far more safe by the adoption of uniform scientific traffic laws in all the states, and by stricter enforcement of the statutes, in the opinion of D. C. Fenner, chairman of the Motor Vehicle Conference Committee and manager of the Public Works Department of the International Motor Co., speaking before the New England Conference of State Highway Commissioners and Motor Vehicle Registrars. The conference of the commissioners was held in connection with the Annual Congress of the National Safety Council.

Mr. Fenner stated that careful analysis of accidents in which motor trucks have figured has revealed the fact that the disasters have usually arisen from excessive size, weight or speed of the vehicles; from overloading or from inadequate or defective equipment. Still other causes were reckless or incompetent operators, improper enforcement of the laws and conflicting traffic regulations as between states or the municipalities within the states.

After citing instances to illustrate the manner in which these causes of accidents have operated disastrously, he recommended to the highway commissioners and motor vehicle registrars that they lend their support to the movement which has been begun to bring about the general enactment and enforcement of uniform motor vehicle laws throughout the entire United States. In this connection he explained those provisions of the Proposed Uniform Vehicle Law which have a vital bearing on those factors, and showed how the adoption of the measures recommended would make for safety.

He concluded by emphasizing to public officials that motor transportation is an increasingly important medium of commerce, that its development is today only in its infancy, and that the wisest course for everyone to pursue is to develop sound and equitable regulations for rendering this new type of transportation safe and not measures for stifling its legitimate and vitally necessary growth.

### Automobile Executive Now Director of A. M. E. A.

The interest of the automotive industry in foreign trade was emphasized when J. Walter Drake, chairman of the Foreign Trade Committee of the National Automobile Chamber of Commerce, was elected October 6 a director of the American Manufacturers' Export Association.

The scope of Mr. Drake's activities in the past have gone beyond the defined line of the automotive field into affairs of United States foreign trade as a whole. It is Mr. Drake's opinion that American automobile export trade can best expand if the United States commerce in general increases abroad, and that any policy benefiting one American industry will, in the long run, also prove advantageous to other branches of United States business.



## Desires Enforcement of Over-loading Laws

Believing that a very large number of accidents are caused by over-speeding of motor cars and motor trucks, coupled with the over-loading of the latter, the N. A. C. C. is calling upon police officials of the country for a more strict enforcement of the traffic laws, of which there are a sufficient number on the books, but the provisions of which have been too generally disregarded.

Reports show that over-loading of trucks of all sizes have in some cases harmed the roads and in other cases have overcome even the powerful brake equipment, resulting in accidents that could have been avoided.

While it is true that the speed craze has long since died out, there are still many who travel at excessive rates, who disregard the rights of others on the highways and who fail to take proper precautions at the intersection of roads and railroads.

The N. A. C. C. believes that a two-ton truck carrying four tons is more dangerous on the highways than a five-ton truck with its normal load of five tons. It endorses the Pennsylvania law which requires each truck to bear a lettering showing its weight, the body weight and the weight of the load which it should carry. The Chamber opposes truck bodies of abnormal size and advocates loads which will conform with the recommendations of automobile and highway engineers for one inch width of tire for each 800 lbs. of weight.

## Lack of Space Handicaps Automotive Exhibit

Viewed from an automotive standpoint the annual New York electrical show, September 21 to October 8, was not as interesting as the 1920 event. This was largely due to the show being held this year in the 71st Armory, where space is limited as compared with Grand Central Palace.

Electric vehicle manufacturers were represented, there being five truck and one passenger maker. The Ward Motor Vehicle Co., Mt. Vernon, N. Y., displayed one of its 1-ton chassis, also a rear axle with housing cut away to display the worm gear used by this company on its

product. Other truck makers were the Walter Motor Truck Co., Commercial Truck Co., Walker Vehicle Co. and the Lansden Co. Rauch & Lang was the only passenger car maker exhibiting.

Two storage battery concerns had displays, one showing all types. There were few electric tools shown. Last year there was a large number of the various applications of electricity in the service station, garage and repair shop.

## Gill Holds Fourth Annual Sales Convention

Sales representatives of the Gill Mfg. Co. from all over the country gathered at Chicago, September 19-22, for the fourth annual convention, which came as a fitting climax to a remarkable sales record for the first eight months of this year, during which period the sales of the Gill company ran 46½ per cent higher than for corresponding period of 1920.

Little wonder, therefore, that the 150 sales representatives—which included 39 branch managers and members of their sales organizations, together with the factory sales department—participated enthusiastically in a two days' merchandising and business program that put them on their toes ready to tackle the future with renewed energy and force.

The entire convention program was planned to give the men the most concrete kind of help in meeting their every day business and sales problems in the field, and results should be far reaching in actual sales records during coming year.

Addresses were made by President E. P. Chalfant, General Manager E. J. Smith, C. A. Musselman, of the Chilton Co., and others, and at the annual banquet, held at the Beverly Hills Country Club, Harry S. Spillman, of the Personality Bureau, of New York, gave the piston ring men a rousing talk that they will not soon forget.

This company has been manufacturing the well known Gill piston ring since 1916. From a small beginning this company has developed rapidly. Now it has 39 branches and a sales organization covering the United States very thoroughly. It is enjoying an excellent export business also. Its history shows a remarkable growth with each succeeding year, and its future is very bright indeed.

## Road Convention for Chicago

In view of the fact that road building now forms the major part of the construction industry, the announcement of the Board of Directors of the American Road Builders' Association, that its next annual convention and good roads show will be held in Chicago, Ill., on January 17, 18, 19 and 20 is of particular interest. More than one billion dollars is now available for highway work in this country and legislation now pending before Congress undoubtedly will be passed, adding many millions more to this account.

In addition to the papers and discussions on important highway problems by leading road builders of the country, the exhibition of road machinery will be an extremely valuable feature. During the past decade, road building methods have been revolutionized by the introduction of labor saving machinery. In 1919, the last year for which figures are available, more than \$100,000,000 worth of road machinery was manufactured, according to the U. S. Department of Commerce. This is greater than the value of all other construction machinery produced in that year and shows the relative importance of the road building industry.

With the central location of Chicago, the immense amount of road money available, and the increased interest in road matters, the directors of the association are of the opinion that the coming convention and show will surpass any previously held and that highway engineers, contractors and officials will attend in greater numbers than ever before.

## Elgin Desires Duty Company

The Elgin, Illinois, Association of Commerce, has paid \$7500 for a tract of land south of the city which will be presented to the Duty Motor Truck Co., which agreed to remove its plant from Greenville, Ill., if a suitable site was donated. Under the terms of the deal, the deed to the land is not to be delivered to the truck company until the buildings are erected and the plant is in actual operation. One hundred and fifty residents of Elgin invested in stock in the company. It is hoped to have the buildings completed by spring.



Branch Managers, Members of the Sales Organization and Guests Who Attended the Annual Sales Convention of the Gill Manufacturing Company, Chicago, at the Chicago Beach Hotel

## Chamber of Commerce Urges Employment Co-operation

An appeal to business men and chambers of commerce the country over to give active support to the emergency program for the relief of idle workers, as advanced by the national conference on unemployment, is made by Joseph H. Defrees, president of the Chamber of Commerce of the United States and a member of the conference.

Mr. Defrees especially urges that business men get behind the plan proposed by the conference for the mayors to organize local emergency committees in their communities. He asks them to offer the mayors immediate assistance of the business organizations in order that the machinery of organization shall be speeded up on a national basis. Every town, says Mr. Defrees, has a responsibility to the nation to organize to meet this question immediately, and the nation can only bring its help to bear when the cities and states are organized so as to make their help effective.

"Business," says Mr. Defrees, "has a very great responsibility in the situation. It furnishes employment. Business men in the communities should take the lead in co-operating with the mayors in creation of the emergency committee and in working out constructive community programs for relieving unemployment in their vicinities.

"The situation cannot be met without proper organization. It is primarily a community problem. The local business man, through his business organization and individually, should make every effort to meet the situation in this city.

"The existing unemployment presents a real problem which must have immediate attention."

## Highway Fellowships at the University of Michigan

The University of Michigan at Ann Arbor, Mich., has always taken the lead in emphasizing the importance of highway transportation by offering courses in this modern subject. The work has attained great success lately under the able direction of Arthur H. Blanchard, professor of highway engineering and highway transport.

The school's latest contribution will be a number of fellowships to be awarded by the Board of Regents not later than November 1, 1921. These fellowships are as follows:

The Roy D. Chapin Fellowship in Highway Transport, which is offered to provide for the investigation of an approved subject relative to Highway Transport.

The Roy D. Chapin Fellowship in Highway Engineering, which is offered to provide for the investigation of an approved subject relative to hard surfaced roads and pavements.

Two Detroit Edison Fellowships in Highway Engineering, which are offered to provide for the investigation of approved subjects relative to moderate cost country roads.

General Conditions: Each Fellowship pays the sum of \$250 with an allowance of \$50 for expenses. The holders of these Fellowships do not have to pay tuition fees. A Fellow must hold a Bachelor's Degree from a college of recognized standing. He must enroll as a graduate student in highway engineering or highway transport and as a candidate for the degree of Master of Science or Master of Science in Engineering. He must be in residence for one of two semesters. An application must include a concise statement of the candidate's educational training and engineering experience, and three references. Applications and requests for information pertaining to the twenty-five advanced courses offered by the Graduate School should be sent to Arthur H. Blanchard, University of Michigan, Ann Arbor, Michigan.

## "High Spots" of the Convention

### A Summary of the Sentiment Expressed by Over 200 Leading Executives

1. The tide has turned. Better business is at hand.
2. The automotive industry has learned to regard itself and conduct itself as a transportation industry, selling America an indispensable utility.
3. "Dream of Ease, but Work Like Hell" selling strategy slogan offered by Vice President W. O. Rutherford.
4. The automotive industry must develop the unconquered markets right before it. For example, production of motor buses to meet immediate city and interurban transportation requirements will alone take up the slack in the truck field.
5. In figuring a sound "normal" for the motor industry, we must regard 1913 as last year; plus eight years of national progress.
6. Stability of automotive industry demonstrated by orderly character of deflation and harmonious adjustment during the twelve trying months just closed.
7. Improvement in banking and credit situation and greater friendliness of financial interests toward the industry; marked improvement in collections generally, as well as reduction in volume of outstanding notes and acceptances.
8. Improvement in labor efficiency, likelihood of progress in taxation and tariff situation, and stabilization of sound price levels in the raw material field.
9. Greater efficiency within the industry as a result of searching self examination, stock-taking, reorganization and liquidation of inventories. Greater attention is being given to quality of product and service, and the interests of the consumer and the general public, as a result of stimulation of competitive competition.
10. Realization that the automobile industry must go forward and will go forward as long as America in particular and the world in general require transportation.

## New York City on Brink of New Transportation Era

"The world is just awakening to the manifold advantages of highway transportation," declared F. W. Fenn, secretary of the National Motor Truck Committee, National Automobile Chamber of Commerce, in discussing the present trend in transportation. "This is manifested in a striking manner in the reports which reach our office from all parts of the country on the decline of the horse, the backbone of the transportation fabric for many years. Registered stallions in Wisconsin decreased from 2437 in 1918, to 1688 in 1920. In the state of Michigan they decreased from 1288 in 1918, to 1068 in 1919. Ohio had 965,000 horses in 1917, and 862,000 in 1919. It is little surprising therefore to discover that the Board of Health's horse census, which will be released shortly, will show that there are today in New York City approximately 10,614 less horses and 1784 fewer stables than in 1919. Only recently one hundred and sixty horses were sold in Portland, Ore., for chicken feed.

"The big problem today on the streets of New York is to keep the traffic moving. The element of time has become the pivotal point in the study of operation costs. In the opinion of W. D. Williamson, an engineering expert, traffic congestion can be traced invariably to slow moving horse-drawn vehicles which retard the fast motor traffic; the horse-drawn vehicle will by the very nature of things therefore be it rarely seen as the bullock wagon. Reductions in general will follow through the opportunity to reduce stables, which are always more or less unsanitary no matter how carefully supervised; to get by congested traffic quicker; to turn around in crowded thoroughfares."

## Reductions Continue in Truck Field

Since the last issue of The Commercial Car Journal a large number of truck manufacturers have joined the price reduction class, realizing that such a step was necessary to place the truck business on its former stable basis.

In many cases these reductions have been made with a sacrifice to the manufacturer, but as the basic industries improve and labor adjusts itself these reductions are beginning to justify themselves. Although the drops ranged from 1 to 20 per cent on the various models, the reductions average about 8 to 10 per cent.

Among the manufacturers reducing were the Thomart Motor Truck Co., the Iowa Motor Truck Co., the Cyclone Motor Corp., the Defiance Motor Truck Co., Facto Motor Trucks, the Wilson Truck Manufacturing Co., Hal-Fur Motor Truck Co., Jackson Motors Corp., Oneida Motor Truck Co., the Standard Motor Truck Co., the Gramm-Bernstein Motor Truck Co., the Sterling Motor Truck Co., the Bell Truck Sales Corp., Atterbury Motor Car Co., Rainier Motor Corp., Triumph Truck & Tractor Co., Vim Motor Truck Co. and the Kissel Motor Car Co.



## Personal Items

**P. E. Bates**, for the past five years affiliated with the Mohawk Tire & Rubber Co., of Akron, will become district manager for Northern Ohio of the India Tire & Rubber Co., of Akron, O.

**George E. Bodwain** has been sent by the American Hammered Piston Ring Co., of Baltimore, to Europe to look after the company's gradually increasing export business.

**F. B. Bradley** has joined the sales force of D. A. Sanders, 66 S. Broadway, Nyack, N. Y., automotive equipment and supplies.

**C. B. Chamberlin**, well known in the truck and passenger car field, will head his own organization, the Cincinnati Machine Products Co., of Cincinnati, a firm to do precision work and to make pins and bolts for the automotive industry. He was recently with the United States Motor Truck Co.

**W. B. Clowes**, assistant sales manager of the Elsemann Magneto Corp., has resigned. He is to be succeeded by O. S. Stanley, formerly assistant service manager of the American Bosch Magneto Corp.

**S. F. Dupree, Jr.**, formerly of Caskey-Dupree Mfg. Co., of the Automotive Products Co., has joined the Universal Drive Shaft Co., Cleveland, O., as vice-president. He will direct all sales and service.

**Richard C. Fowler**, formerly assistant sales manager of the Delco Light Co., in Dayton, O., is now vice-president of Campbell, Trump & Co., 1830 Penobscot Bldg., Detroit.

**William H. Herbert** has been announced as general sales manager of the Denby Motor Truck Co., Detroit. He succeeds L. B. Graham, who has resigned.

**E. T. Herbig**, sales manager of the Service Motor Truck Co., of Wabash, Ind., and previous to that advertising manager, associating with the company for five years, has taken a position in a special sales capacity with the General Motors Truck Co.

**Oliver H. Hunter** has assumed his duties as field secretary of the Pennsylvania Rubber & Supply Co., 2819 Prospect Ave., Cleveland, O. Formerly manager of the Erie branch.

**U. G. Lyons**, of Warren, Pa., was elected president of the National Petroleum Association at the convention at Atlantic City, N. J., September 23.

**Ralph C. Matthiesen**, president of the Motor Haul Age Co., of New York City, has been appointed to be a special assistant to postmaster general to reorganize postoffice motor transport service.

**A. C. Maucher**, of the Standard Steel Car Co., of Pittsburgh, has resigned to become general manager of the Ray Battery Sales Corp., of 1926 Broadway, New York City, distributing the Ray battery in eastern New York and northern New Jersey.

**W. R. McCulla** has been appointed district manager of the Asbestos & Rubber Works of America, Inc., 1821 Broadway, New York City, also the Bijur Motor Appliance Co., of Hoboken, N. J., and will have charge of the manufacturers' sales for the Detroit and Cleveland territory, with offices at 58 Garfield Bldg., Detroit.

**Edward O. McDonnell** has assumed his duties as general manager of the Kelly-Springfield Motor Truck Co., of Springfield, O.

**George B. Nason**, of the advertising department of the Champion Spark Plug Co., Toledo, has assumed the duties of advertising manager, succeeding H. L. Corey, who has resigned to join E. B. Wortman in an advertising agency in Utica, N. Y.

**H. E. Rice**, commercial manager of the Atwater-Kent Mfg. Co., has resigned to become associated with the American Bosch Magneto Corp., as assistant to Arthur T. Murray, president.

**L. K. Rittenhouse** succeeded L. I. Ris as eastern district manager of the Star Rubber Co., 226 West 52nd St., New York City. Mr. Rittenhouse brings 14 years of experience in the rubber industry to his new position.

**Charles L. Shedd** is the new manager of the Detroit branch of the American Bosch Magneto Corp., replacing Roy Davey, who has been moved to the factory offices at Springfield. Mr. Shedd was at one time promotion manager, truck division, Packard Motor Car Co., and later sales manager of the Republic Truck Corp.

**Olin R. Smith**, who for three years has been advertising manager of the Moto-Meter Co., Inc., Long Island City, has joined the staff of the Palmer Advertising Service, 137 E. 43rd St., New York City.

**R. H. Spencer** has been placed in charge of truck distribution of Latham Davis & Co., Inc., of San Francisco, distributors of the Kissel.

## New Incorporations

The Safstrom Manufacturing Co. has been incorporated at \$30,000 in Chicago to manufacture and deal in automobile parts, accessories and tools.

The Victor Bearings Co. has been incorporated at \$300,000 to take over the properties of the Modern Die & Tool Co., Indianapolis. Work is soon to begin on a \$50,000 factory building.

The Champion Porcelain Co., capitalized at \$750,000, has been organized by the Champion Spark Plug Co. at Toledo, to absorb the business of the Jeffery DeWitt Co., of Detroit.

The Electric Battery Service Co., Peoria, Ill., has been incorporated with a capital stock of \$15,000 and will be located at 706 Main St. The incorporators are A. S. Pierce, H. F. Gee, Dwight Orr and R. C. Orr.

The Universal Roller Bearing Corp. has been organized at Norfolk, Va., to manufacture roller bearings. Capitalization \$500,000.

## Factory News and Capital Increases

The Gordon Tire & Rubber Co., of Canton, O., has been released from receivership and has assumed operations. The present equipment is sufficient for operations and is in good condition, the court was told.

The Gary Motor Truck Co., of Gary, Ind., is effecting an amalgamation with the Chase Tractor Co., of Toronto, with a combined capital of \$2,000,000.

Raybestos Co., of Bridgeport, Conn., has increased its capital stock from \$3,000,000 to \$8,000,000. The increase was made to finance the purchase of the General Raybestos & Rubber Co., of Charleston, S. C.

The Mason Tire Corp., of New York City, has declared its semi-annual dividend of 4 per cent on preferred stock. Sales of the firm for the first six months of 1921 were greatly in excess of those for the similar period of 1920.

The American Railway Express is asking all shippers for their co-operation in putting over the "Perfect Package Month" campaign during November. Shippers can greatly aid by exercising the greatest care in addressing and preparing packages for shipment.

The Mifflinburg Body Co., of Mifflinburg, Pa., due to a rapid increase in commercial body business, has found it necessary to erect a three-story brick building, 62 x 200. The factory already occupies a quarter of a million square feet of floor space.

## Removals and Trade Changes

The Quaker City Rubber Co., of Philadelphia, is soon to move into its new Quaker Bldg., at 624 Market St. The building will house the main offices and sales rooms.

The General Motors Corp. has decided to transfer the executive heads of the company from New York to Detroit to gain closer coordination between the control offices and the factory. The corporation now includes 78 subsidiary and affiliated companies.

Commercial Cars, Ltd., Toronto, Canada, distributor of Commer cars and Stewart trucks, announces that offices, show rooms and service station are now under one roof at 115, 117 and 119 Dupont St.

The Madison Tire & Rubber Co., Inc., has moved its general offices from 20 West 60th St., New York City, to its factories at Buffalo, N. Y. The move is made to expedite orders and effect further economies, the company announces.

The Chicago Belting Co. now has an up to date direct factory branch at 336 3rd St., Pittsburgh, Pa., from which it is doing a large amount of its total distribution.

The Goodyear Tire & Rubber Co., of New York, at a special meeting of the stockholders approved a plan recommended by the directors to dissolve the New York company.

## New Agencies

The O. Armleder Co., Cincinnati, announces the following new agencies for its trucks: Allender Bros., Inc., 2601 Pennsylvania Ave., Baltimore; J. M. Hunt Truck and Tractor Co., Charleston, W. Va.; Camden Motor Sales Co., Clarksburg, W. Va. and the Union Motor Car Co., Paducah, Ky.

The Harrisburg Harness & Supply Co., of Harrisburg, Pa., has been announced as local dealer for the products of the India Tire & Rubber Co., of Akron, O.

The Splittdorf Electric Co. has re-established itself in "auto row," New York, with a service station in the Paige Bldg., 1755 Broadway. Charles N. Neil is the new district manager in control of the branch.

The Federal Automotive Sales Co., of Detroit, is to distribute products of the Penberthy Injector Co. in the states of Ohio, Michigan, Illinois and Indiana. E. H. Janes is president of the company.

Earl P. Cooper Co. has been appointed distributor of the Perfecto two-speed axle products for Fords in northern California, maintaining centers at San Francisco, Oakland, Sacramento and Fresno. The products are made by the Ruskstall Sales & Manufacturing Co.

The Missouri Auto Signal Co., 1421 Locust St., St. Louis, Mo., has been awarded the distribution of Kobzy safety signals manufactured by the Chicago Die & Specialty Co., for St. Louis and the adjacent territory.

## Obituary

E. W. Brooks, acting factory representative in the southwestern states for the Acme Motor Truck Co., Cadillac, Mich., died suddenly at Kansas City, September 19, as a result of apoplexy. Mr. Brooks has been prominently identified with several of the leading firms in the automotive industry and has always been a great asset to the Acme organization. He was an intelligent earnest worker and he possessed a pleasing personality which gained him a host of friends in the industry.

# NEW COMMERCIAL CARS



## Security Twin-Drive Truck

**A**CCORDING to the Freeman Motor Co., Omaha, Neb., a truck to successfully meet all conditions, must be built on the 4-wheel drive principle, where the power is delivered to all four wheels, giving greater ability to carry capacity loads, as well as trailers, over all kinds of roads.

In a new type of 4-wheel drive, front wheel steer truck, recently designed and built by this company, these requirements are said to have been met. It is known as the Security Twin Drive, a high-power, high-speed road express truck, of  $2\frac{1}{2}$  tons capacity. Because of its wide range of gear ratios, eight speeds forward being provided, it is said that it can readily adapt itself to any manner of going.

One of the most important points of this design is the application of power to the front wheels, in order to obtain an easy steering vehicle and, at the same, a simple drive. This has been accomplished by employment of the bevel design, as may be seen from one of the accompanying illustrations. The maker also points out that no matter how great the angle to which the front wheels are turned to, the gears transmitting the power have absolutely fixed center distances. No strain or load is carried by steering mechanism.

The power is transmitted from the engine through a four-speed constant mesh type transmission, which is connected by a disk type universal joint to the transfer case, which is located in the center of the truck between the front and rear axle. The transfer case consists of an upper and lower shaft, upon which are mounted two pairs of silent chain wheels, the power being transmitted through 4-in. silent chains to the lower shafts. Through the shifting of a jaw clutch it is possible

to get 2 to 1 reduction on the engine speed, giving a final low gear reduction of 72 to 1, which is stated to be ample to carry a truck over an 80 per cent grade.

The 2-chain wheels on the lower shaft are fastened to an automatic type locking differential.

This center differential is the point where the power of the engine is divided and sent to each axle in its proper proportion; its action between the two axles being the same as that of the front and rear differential between the wheels. The locking type of differential is also used and is interchangeable in the front and rear axles.

Another feature of the Security truck is said to be its scientifically efficient braking system. Braking action is on the drive as well as on all four wheels. The service or foot brake is located on the main shaft of the transfer case, integral with the 2 to 1 reduction gear. It is com-

pletely inclosed and operates in oil. The emergency brake is located on the secondary shaft of the transfer case and is operated by hand lever.

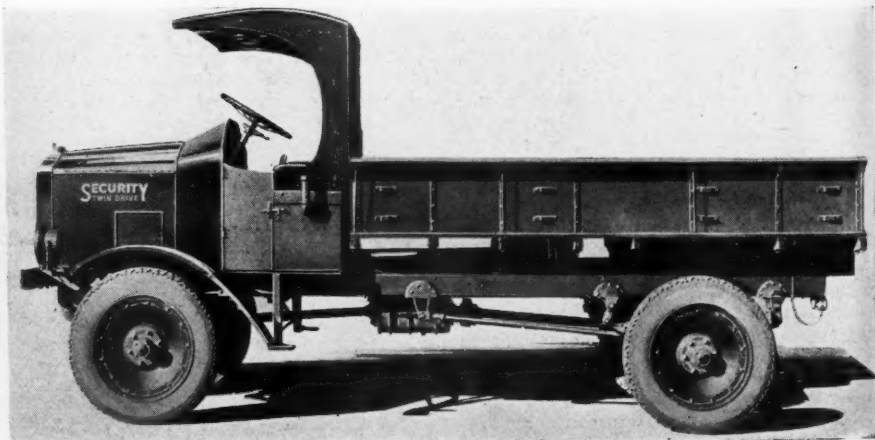
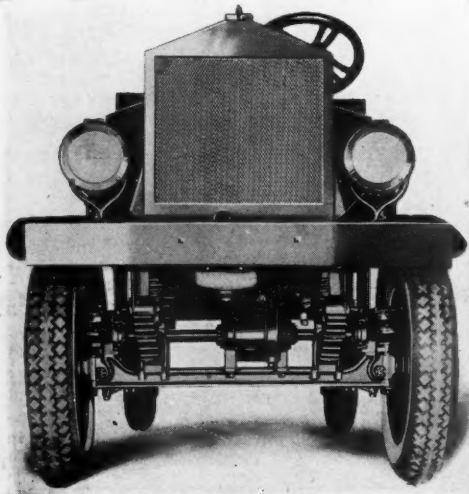
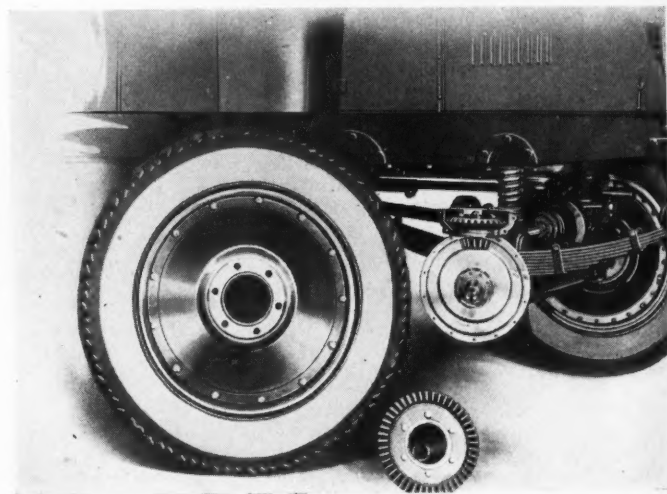
The engine is a Model HTU Buda, a four-cylinder, verticle L head, detachable head type. It is suspended from three points and has a bore and stroke of  $4\frac{1}{4}$  in. x  $5\frac{1}{2}$  in., respectively. S. A. E. rating, 29 hp., and brake hp., 52. Speed is controlled by a Pierce governor.

Ignition is by a Bosch or Eisemann high-tension magneto. The carburetor is a Zenith, of the float feed type,  $1\frac{1}{4}$ -in. opening. The air intake is connected with a stove on the exhaust. Dash air control. Gas is fed from a 30-gal. tank, located under the driver's seat, by a vacuum system to the vacuum tank on the dash and from there by gravity to the carburetor.

The lubrication system includes a pump, operated by spiral gears and capable of developing 39 lb. pressure at 1000 lb. pressure.

### Views Showing Construction of the Security Twin-Drive Truck.

Its adaptability encompasses all manner of work. It is four-wheel-drive and front-wheel steer.





Cooling liquid is circulated by a gear-driven centrifugal pump. Capacity of the cooling system is 8 gal., which can be completely drained. Cooling is further aided by a 4-blade fan, 18 in. in diam., mounted on an adjustable bracket and driven by a flat belt 2 in. wide.

From the engine the power is transmitted through a Detlaff multiple-disk, dry-plate clutch to a constant-mesh Cotta transmission. This gearset provides four speeds forward and one reverse. The gear ratios are as follows: 1st, 5.2 to 1; 2nd, 3.684 to 1; 3rd, 1.857 to 1; 4th, 1 to 1, and reverse, 4.666 to 1. The transfer case is patented. Link Belt Silent Chain Drive, giving choice of two ratios, 1 to 1 or 2 to 1, from all speeds obtainable in transmission. The rear axle is internal gear drive. All rotating members are enclosed and operate in oil. Powerlock differential-axle ratio is 7 to 1. Hess-Bright

and S. K. F. bearings are used throughout.

Final gear ratios from engine to wheel are as follows: 7:1, 4th or high; 12.99:1, 3rd; 25.78:1, 2nd; 36.4:1, 1st, and 32.66:1, on reverse. By shifting the jaw clutch in transfer case to 2 to 1 reduction: 14:1, 4th; 25.99:1, 3rd; 51.75:1, 2nd; 72.8:1, 1st, and 65.33:1, on reverse.

The front axle is bevel gear drive. The load carrying member is a steel forging of I beam construction.

The drive shaft is of Norwalk seamless steel tubing, heat-treated and welded to drop-forged steel spiders, equipped with Goodrich driving disks.

The Parish & Bingham pressed steel channel section frame is 216 in. long, 34 in. wide, inswept to 31 in. between front wheels. It is supported by four semi-elliptic springs. The steering gear is a

Wohlrab No. 4, mounted on the left side of the chassis. Diameter of wheel is 22 in.

Disk type Distel-pressed steel wheels are used. They are detachable and demountable and fit either front or rear axle. Tire equipment is Firestone pneumatic, 38 in. front and rear.

The Security Twin Drive is completely electrically equipped with Westinghouse starting motor and generator, Exide battery, two high-powered headlights, which have a special feature incorporated in them which allows these lights to be swung backwards, throwing a light to the rear of the truck when loading and unloading in the dark; also electric tail light and electric horn.

An air pump is fitted to the side of the transmission case for the inflation of the tires, with hose and air gage to reach all four wheels.

## Wisconsin Six-Cylinder Speed Truck

**D**ESCRIBED as a powerful, high-speed truck, the six-cylinder Wisconsin motor truck, manufactured by the Wisconsin Truck Co., Loganville, Wis., is claimed to contain the necessary mechanical prerequisites for adaptation to any kind of hauling of three tons or less.

It is pneumatic equipped, and the comparatively light weight and smooth running qualities are two of the features that figure largely in the claim of maximum tire mileage. The price complete with body, cab and other standard equipment, as hereinafter described, is \$2750, plus war tax.

The maker states that it is economical to operate and thoroughly reliable. The complete job is attractive in general design and finish.

The following is a brief resume of the principal features of construction, units, specifications and standard equipment:

Power is provided by a Continental six-cylinder engine, having a bore and stroke of 3½ in. x 5¼ in., respectively. Ignition is furnished by a Bosch high tension mag-

neto. The starter and generator is also of Bosch manufacture.

From the engine the power is transmitted back through a Borg and Beck disk clutch to a selective sliding gear transmission, providing three speeds forward. A two-section, full-floating propeller shaft, equipped with ball and socket universals, carries the power to the rear axle. Final drive is through a Torbensen internal gear. The ratio is 7 to 1.

The front axle is of the conventional I-beam construction, equipped with roller bearings on the spindles. Four semi-elliptic springs support the channel steel, hot-riveted frame.

Pneumatic equipment consists of giant non-skid cords, 38 x 7-in. rear, and 36 x 6-in. front. Both head and tail lights are electric. The wheelbase is 146 in. The job complete is finished in brown with red wheels.

A combination box body or platform body, and full cab, with side curtains or with full height doors, are included as standard equipment. The weight is 4700 lb.

## Imperial Line of Buses Are Announced

The Trackless Transportation Corp., 300 Madison Ave., New York City, are offering to the trade a new type of omnibus said to have been evolved after extensive investigation. This new bus is known as the Imperial, and will be built, all of the same character of construction, in 20 and 30 passenger, single-deck and 49 passenger, double-deck models. The important factors claimed to have been met in a completely definite manner are: Low cost of maintenance, maximum of safety and comfort to the passengers, and general economy of operation.

The units employed in the construction of this job are of special design and in every case selected after careful study. The engine is Buda make and the transmission is of the four-speed type mounted amidships. Chassis equipment includes: Complete electric starting and lighting system, speedometer, power tire pump, Moto-Meter and complete tool equipment.

The body is of steel construction throughout and is of the truss side type. Entrance is forward right. The folding door drops sufficiently to provide easy entrance with two short steps.

The interior is finished in birch, stained mahogany color. The roof is of Haskelite finished in white enamel. Illumination is provided by seven dome lights and one step light. The interior is also well equipped with pedestals, seats, end brackets and grab handles of Lynite. Push buttons are provided at each seat.

Another feature in design is three exhaust ventilators arranged along the center line of the roof, covered with aluminum grills.

## Duty Truck Plant Begun

Ground will soon be broken for the new plant of the Duty Motor Corp., at Elgin, Ill., which recently decided to remove from Greenville, Ill., and which manufactures motor trucks. M. L. Frank is sales manager. Residents of Elgin have subscribed for a large block of stock.



Wisconsin Six-Cylinder Truck. It is Rated at Three Tons and is Especially Suited for Dispatch Work

## "Speedboy" New One and a Half Ton Traffic Job

**I**N announcing the new Traffic 1½-ton "Speedboy" the Traffic Motor Truck Corp., St. Louis, has endeavored to meet the present-day need of merchants and manufacturers with a light, speedy, economical delivery vehicle that combines unusual qualities of sturdiness and convenience with remarkable attractive appearance. Special attention is given in the design to secure a large loading space with short turning radius and low-hung chassis. It is listed at \$1650.

The equipment includes pneumatic cord tires on heavy disk airplane type wood wheels and electric lights and starter. The top is full length, 5 ft. from the floor, with roll-up curtains at side and rear end; driver's cab is roomy and comfortable, also with side drop curtains. Load area measures 8 ft. inside from rear of seat by 44 in. wide.

The quality of the "Speedboy" is best indicated by the standard units combined in its design, such as: Continental motor, Bosch magneto, Covert transmission, Gray & Davis starting and lighting system, Carter carburetor, Russel internal gear rear axle, Timken roller bearings, Detroit steel springs, Fisk tires.

Complete specifications in greater detail are as follows: Maximum capacity, 3000 lb.; chassis weight, 3400 lb., and road clearance, 12 in. The engine is a Continental 4-cylinder unit power plant, 3-point suspension, 3¼ in. bore, 5 in. stroke, 3-bearing crankshaft; maximum engine speed, 2000 r.p.m.

Lubricating system is combination force feed and constant level splash; gear driven pump supplies oil to timing gears and main bearings; other parts lubricated by oil splash.

Carter carburetor is special automatic with gravity feed; gasoline tank, capacity 12 gal., is made of pressed steel and located on dash.

Ignition is Bosch magneto, cooling is thermo-syphon aided by a 15-in. fan. The radiator is of the cellular type mounted in

a 4-piece cast-iron shell, non-corrodible. The clutch is of the multiple disk type, enclosed and completely protected from dirt. Three speeds forward and one reverse is provided by a Covert gear-set.

The two-piece propeller shaft is equipped with 3 universal units, and alignment is maintained by a self-aligning roller bearing. Control consists of steering gear on left, 18-in. wheel, worm and gear type; gear shift and hand brake levers in center; foot accelerator for carburetor; hand spark and throttle control on steering column.

The rear axle is Russel Internal Gear. Internal expanding and external contracting brakes insure positive braking action.

A conventional I-beam, drop forging with Timken roller bearings at wheels, makes up the front axle. Heavy truck type Detroit steel springs are used. The frame is of exceptional strength, being

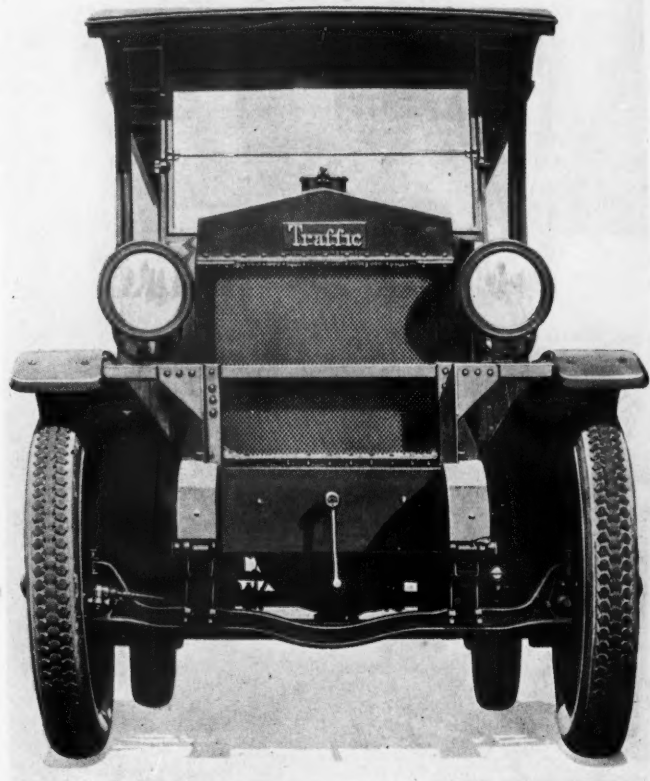
made of 6-in. U-channel structural steel, 177¼ in. long over all, with ends heavily bound and gusseted.

Demountable rims. The wheelbase is 128 in., with length of frame back of driver's seat, 86½ in.

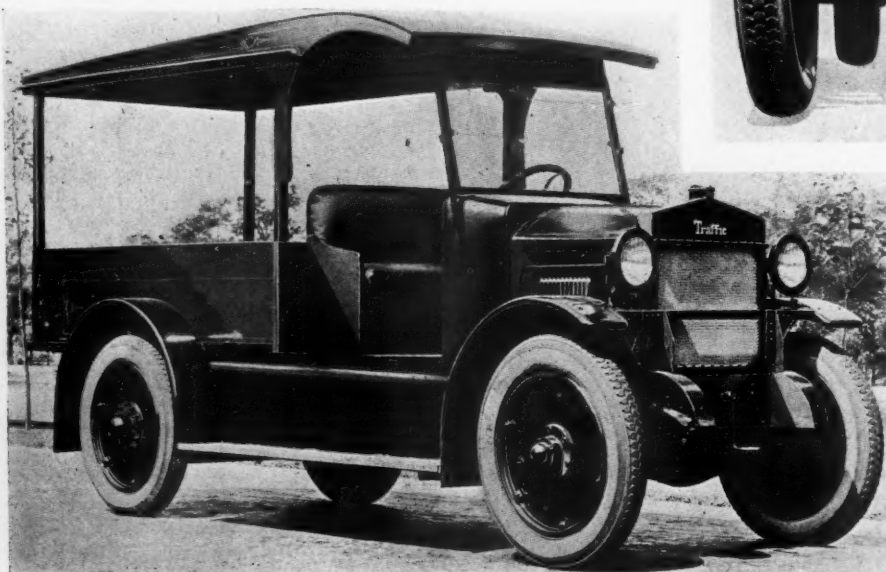
Pneumatic cord tire equipment is Fisk, 35 x 5 front and 35 x 5 rear; starting and lighting system, Gray & Davis; starter, Bendix drive; generator, Gray & Davis; head lamps complete with single contact dimmer and head bulbs and non-glare lenses; tail lamp.

Equipment includes pneumatic cord tires, starting and lighting equipment described above, explosion whistle, full set of 16 gage roll fenders, running board skirts, front splash, running boards, speedometer, 2-way ventilating metal windshield, seat and cowl, canopy top body; full set of tools; chassis and body complete painted, striped and varnished.

Front View of the New Traffic "Speedboy." It is Pneumatic Cord Tired Disk Wheel and Electrically Equipped. It is Listed at \$1650



Special Attention Has Been Given in the Design to Secure a Large Loading Space, With Short Turning Radius and Low-Hung Chassis



Body specifications are as follows:

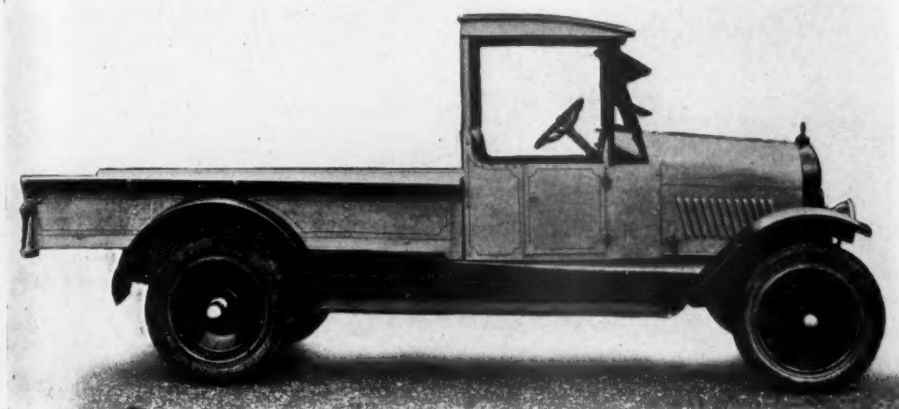
Panels, 7/8 in. gum, 15½ in. high, reinforced with oak rail at top; flares 7/8 in. clear oak, 6 in. wide, 45 deg. angle; tail gate dropped with chain; top, 4-post stationary extending full length of body and over dash; roof covering No. 10 sailduck painted, roll-up curtains of black oil duck on each side and rear end; posts of close grain white ash; height of top 5 ft. from floor to underside of top; cushion of imitation leather with deep cushion springs and lazy-back full upholstered with springs. All ironing hand forged and bolted with through bolts. Driver's cab equipped with drop curtains, and well reinforced throughout.



## Larrabee Announces New One-Ton Six

**A** NEW six-cylinder speed truck described as being armed with power, sturdiness and quick get-away was recently put on the market by the Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y. Full freight capacity with passenger car flexibility are

the Larrabee-Deyo line now consists of five models, namely, 1-, 1½-, 2½-, 3½- and 5-ton units. The Larrabee Company is a name of long standing, an outgrowth of the wagon and sleigh constructing days. It was organized thirty-five years ago and its activities up until seven years ago was



Note the Attractive Lines Preserved in This New Six-Cylinder, One-Ton Larrabee Speed Job

the points featured. Its flexibility enables ease of negotiation through the heavy congestion of city traffic by reason of its low throttling ability and quick get-away. It is claimed that it can pick up a speed of 25 m.p.h. within 40 ft.

With the addition of this new model

devoted exclusively to the manufacture of horse-drawn vehicles. The prestige and reputation acquired in this business by the company is well known amid wagon business circles. When the change of times, brought about by the advancement of the automotive industry, pointed out the uni-

versal need for motor propelled units, the company entered this new field with the one purpose of offering its new product on the same basis that gained for it the popularity of its earlier-day products, namely, quality, value and service.

This new job with its inswept frame presents a neat and well lined appearance. Comfort for the driver received consideration in the designing of the cab, it containing well upholstered seat and back, top and two-piece windshield.

The 138-in. wheelbase provides an evenly distributed loading space of 9 ft., measured from the rear of the driver's seat. As may be seen from the illustration, it is Disk steel wheel equipped and mounted on 34 x 5 truck cord tires.

The following consists of major specifications:

Continental model 7R engine having a bore and stroke of 3½ in. x 4½ in. Brown-Lipe clutch and transmission, Gemmer steering gear. Inside control. Special heavy, spiral, bevel-gear rear axle and Brown-Lipe-Chapin differential. Gear ratio, 5¼:1. Engine ungoverned and will develop 45 hp. at 2500-3000 r.p.m. American Bosch ignition and starting equipment. Exide batteries. Zenith carburetor. Springs: rear, 54 in.; front, 38 in.

Price, complete with windshield, seat, cushions, electric lights and starter, \$1925; with express body, cab, curtains, windshield, electric lights and starter, \$1990; with express body, canopy top, curtains, windshield, electric lights and starter, \$2050; with cab, curtains, windshield, standard stake body, electric lights and starter, \$2050.

## Specially Equipped Denby for City Work

**T**HE motor truck of today is a major factor in the expeditious removal of a big city's garbage. Speed and ease of handling are especially necessary during the hot summer months. The Denby Motor Truck Co., Detroit, Mich., recently furnished the City of Detroit a model 27, 4-ton Denby, equipped with specially designed body and hoist.

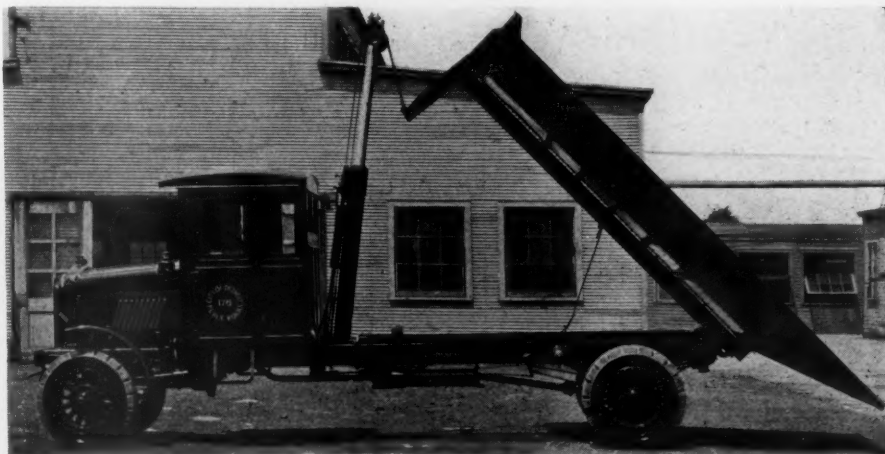
One of the most important facts considered was that the body should be dumped, thereby insuring better sanitation. In order to properly do this, a special Woods hoist providing a 51 deg. elevating angle was used. In order to allow quick return of the body after dumping, an extra expansion chamber was incorporated in the hoist. The hoisting apparatus is connected directly with the transmission through a power take-off and control of the entire mechanism is obtained from the driver's seat.

Body construction is such as to prevent leakage. When covered, the body exhibits nothing of its load. One solid sheet of boiler steel is used for the front end, bottom and lip of the body. No joint is

present at any point, thereby insuring extreme ease in dumping the load. All rivets are countersunk and brazed and in order to prevent leakage all joints were welded. The body is 16 ft. long and handles 7800 lb. every load, working sixteen hours daily with two shifts of men.

Enough slack is allowed in retaining cable so that when the hoist performs its full duty the cable catches the body up sharply, snapping out all of the remaining refuse.

It is Sewell cushion wheel equipped with Kelly caterpillar tires. Comfort and protection for driver and helpers is secured by the installation of a special three men enclosed cab of the all weather type. Electric lights, front and rear and generator and battery equipment are added features. Drawbar attachment is provided.



Specially Equipped Denby to Expedite Garbage Removal

## Eugol Speed Truck Offered by New Company

**E**UGENE GOLDMAN, the organizer and former vice-president and general manager of Master Trucks, Inc., has organized a new motor truck company, the Eugol Motor Truck Co., with headquarters at 116 S. Michigan Ave., Chicago, and factory at Kenosha, Wis., through which he will market the Eugol speed truck.

The design of the Eugol speed truck is stated to be the result of vast experience in the transportation field. It is a quality product, containing only the best known and proven standard units in its construction. An open cab, with cushion, lazy back, side curtains and glass windshield are standard equipment.

The company will also specialize in various standard bodies, such as express, with or without canopy top, platform stake, grain, stock, passenger carryall, school, jitney and hotel buses.

Present factory capacity is 20 trucks per day. An additional building 385 ft. long is now under construction, which will be used exclusively for body storage and painting.

The following is a brief outline of specifications:

**Engine**—Buda M U "Buddie,"  $3\frac{5}{8} \times 5\frac{1}{2}$  in., four-cylinder, removable cylinder head, all working parts enclosed, three-point suspension, rear motor supports mounted flexibly on cushion springs and crankshaft carried on three extra large bearings.

**Lubrication**—Full force self-contained positive pressure feed.

**Cooling System**—Water circulated by centrifugal pump, liberal water passages.

**Radiator**—Mounted on coil springs to relieve vibration and road shocks. Tubular core, with cast tanks and sides—upper tank of polished aluminum.

**Carburetor**—Air adjustment on dash. No governor.

**Electrical Equipment**—Westinghouse starting and lighting system. Battery under seat. Two electric headlights with dimmers and non-glare lenses. Tail light and horn.

**Clutch**—Multiple-disk dry-plate faced with Raybestos.

**Transmission**—Three speeds forward and reverse. Gears and shafts of nickel steel. Unit power plant.

**Propeller Shafts**—Tubular shafts equipped with three dustproof, oiltight Universal joints, center joint mounted on S. K. F. self-aligning bearing, eliminating all whipping action.

**Frame**—Pressed steel, with all spring hangers and cross-members hot riveted. 6-in section,  $2\frac{1}{2}$ -in. flange, 7-32-in. stock. Five cross-members reinforced by gusset plates. 8 ft. 6 in. back of driver's seat.

**Springs**—Mather semi-elliptic front and rear, heat-treated and oil-tempered chrome vanadium steel.  $38 \times 2\frac{1}{2}$  in. front and  $48 \times 2\frac{1}{2}$  in. rear. All spring eyes bronze bushed.

**Front Axle**—Timken drop-forged I-beam with Timken roller.

**Rear Axle**—Timken latest type worm drive with F & J tooth. Timken roller bearings.

**Steering Gear**—Ross semi-irreversible. Worm and solid nut type.

**Wheels**—Artillery type, with air dried second growth hickory square spokes.

**Wheelbase**—135 in. (Wheelbase for contractor's special mounted with dump body, 110 in.)

**Tread**—56 in.

**Tires**—Front and rear,  $35 \times 5$ -in. pneumatic cord construction, heavy truck type. Tire pump mounted on transmission.

**Gasoline Tank**—Located under seat, extra heavy, leakproof, 14-gal. capacity, vacuum feed.

**Chassis Lubrication**—Alemite.

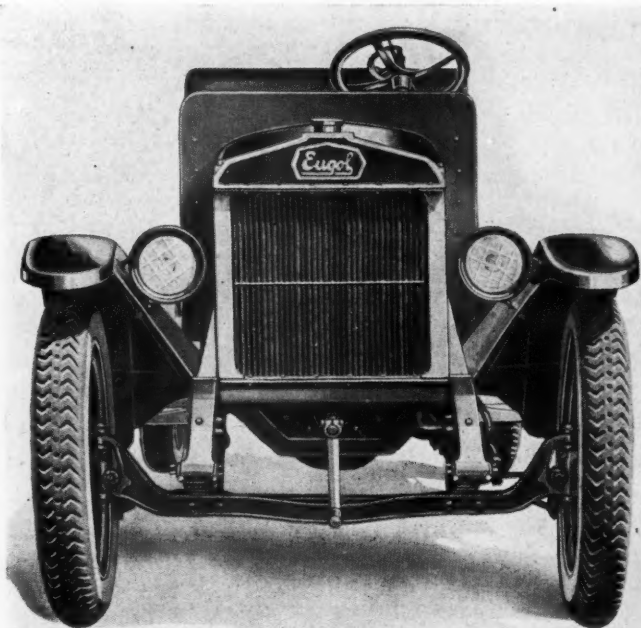
**Color**—Eugol bright red.

**Additional Equipment**—Speedometer, jack, complete set of tools.

**Capacity**—2000 lb.

**Price**—\$1895 f.o.b. factory.

Front View of the New Eugol One-Ton Job. Standard Units Are Used in Its Assembly. It is Listed at \$1895.



An Open Cab, With Cushions, Lazy Back, Side Curtains and Glass Windshield Are Standard Equipment.



### Bill to Limit Truck Length

Trucks will be limited to thirty feet in length, according to an ordinance introduced before the Commission Council of New Orleans. Their speed limit is fixed at fifteen to twenty miles an hour in the daytime, according to size, and ten miles at night. Heavy trucks are also barred from the principal part of the commercial district.

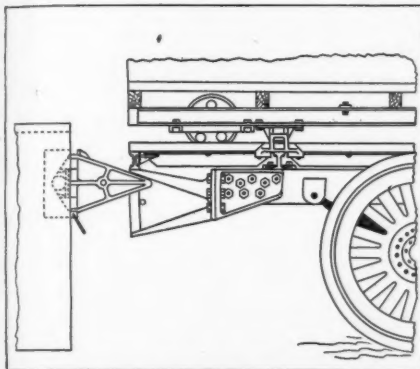
### Correction

In the description of the Scintilla Magneto which appeared in the September issue of the Commercial Car Journal, the captions of the illustrations on the top of page 37 were inadvertently transposed. By transposing the captions as they now appear a correct version of the illustrations may be had.



# Roloff Bodies Reduce Delivery Time and Cost

**S**PEED is one of the considerations of prime importance in motor truck transportation today. There is a pronounced need for more efficient and more economical transportation especially in city and inter-urban deliveries. Wide awake business men are constantly on the alert to cash-in on time and labor saving equipment to meet the demand for increased operating efficiency so urgent during the present economic readjustment through which we are passing.



**A Loaded Body**

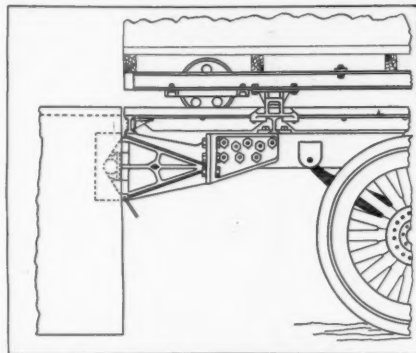
Showing the wedges raising chassis to proper level; also how they ease the load to the springs on leaving

It is generally conceded that loading and unloading is the big and important factor in practically all trucking work. Also, that the average time consumed by each truck depends largely upon the nature of the business. Hence, if a saving of time and human energy can be exacted by the utilization of demountable body equipment, adaptable to the various hauling requirements of concerns, good business demands its use.

The Perin Automotive Engineering Co., Inc., transportation efficiency engineers, 846 Commonwealth Ave., Boston 47, Mass., in offering its Roloff Demountable Body Equipment is realizing a simple and practical equipment that will enable the truck owner to keep his trucks on the road, to utilize every moment of the driver's time and eliminate all waste energy.

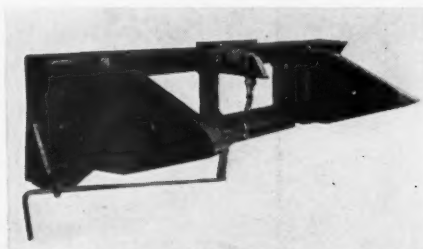
With this equip-

ment merchandise can be stored in the body ready to go and not on the shipping floor ready to load. Besides yard congestion is avoided, by reason of the short time required to load a truck and send it on its destination, thus



**Wedge and V-Blocks Engaged**

When fully engaged the chassis is locked and springs neutralized while the body is shifted

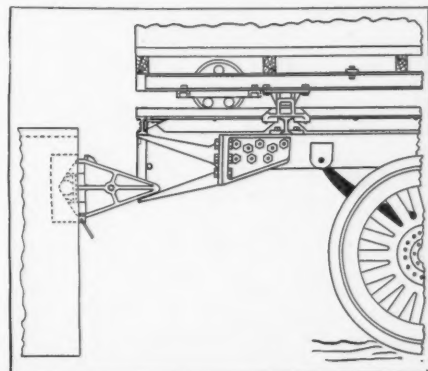


**Wedge Block Assembly**

Note the automatic latch which locks the chassis to the platform while body is being moved

making room for other waiting trucks.

The possibilities of reducing the time factor in loading at the platform can readily be conceived. When the truck arrives at the loading platform it backs against a leveling device, which brings the tracks of the chassis to the level of the tracks on the platform (note the accompanying illustration). The body of the truck is held securely to the chassis in four places. By pushing down the levers of two forward locks the body is released and may then



**An Empty Body**

Showing how the wedges pull the tracks on the chassis down to level of those on platform

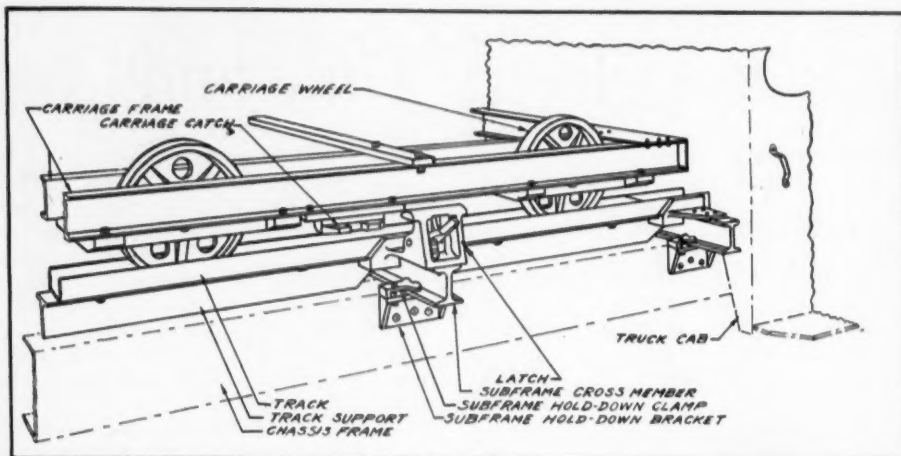
be rolled off onto the platform by hand.

When the body is removed, the lock which holds the chassis to the platform is released and the truck changes to a position in front of another loaded body. Here it is again leveled and locked by another leveling device, and the loaded body is rolled from the platform to the chassis by hand. The body is automatically locked in place by the two body locks and two catches, so that it cannot come off. The truck is then ready to deliver its load.

All this is accomplished within six to ten minutes from the time the truck arrives at the loading platform. All that is required of the loaders is the steady checking and stowing of merchandise in the empty bodies, which are dispatched immediately upon the return of the chassis. The employment of this system prevents



**Exchanging an Empty Body for Loaded One. Average Time Consumed in Exchange, Eight Minutes**

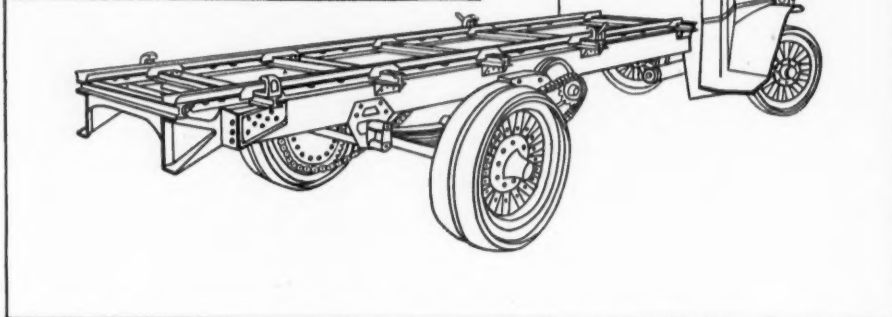


**Above: Showing One of the Body Locks**

As body moves forward the carriage automatically locks chassis fast.

**Upper Right: Showing the Carriage, Which May Be Mounted Under Any Body**  
Fitted with Hyatt roller bearings, wheels perform smoothly and easily.

**Lower Right: Chassis Fitted With Roloff All-Steel Frame**  
Noté the track construction, and automatic body lock at the front.



confusion, eliminates the hustle and bustle of getting the truck loaded and out as under the old plan, does away with extra men, idle time, power to operate, and yet there are many hours added every day to the delivery time of every truck.

Roloff equipment is well constructed of steel and iron, and is capable of withstanding severe service. The chassis is fitted with a special all-steel frame and the design of the Roloff carriage is such as to

permit it to be mounted under any make or style body. Whether loaded or not the body movement is smooth and easy, responding quickly to but very slight manual effort. This is due to the Hyatt roller bearing equipped wheels with which the carriage is fitted.

A novel and most practical constructional feature is the wedge block assembly, which brings the tracks on the chassis exactly level with, and in front of, the

tracks on the loading platform. As may be observed from the illustration, a strong latch, automatic in action, is provided on the upper side of the cross member and centered between the two wedges. It is the latch which locks the chassis to the platform while the body is being moved. It is easily pulled out of engagement for releasing by pulling a lever at the left of the chassis.

## The Automatic Electric, a New Development in Electric Motor Cars

An efficient, economical car that is claimed to do anything that a larger car will accomplish within a radius of 50 to 60 miles, at a speed of 15 to 18 miles per hour, was recently put on the market by the Automatic Transportation Co., Buffalo, N. Y. It is known as the "Automatic Electric," and is also manufactured in commercial and industrial shop car models, all having the same general chassis and mechanical features.

Aside from its economy of operation, this job has many distinct advantages. Because of its size it can be parked in a space 4 x 8 ft.; it is ideal for use in congested traffic. It is comfortably upholstered in leather, having a deep soft seat and back rest. The placement of the steering and control levers is such that the driver may enjoy restful support at all times.

The commercial model is unique and ideally suited for the high-class merchant and retailer. It possesses advertising value because of its size and impressive appearance. It not only meets his haulage requirements, but insures clean, reliable deliveries at a small operating and maintenance cost.

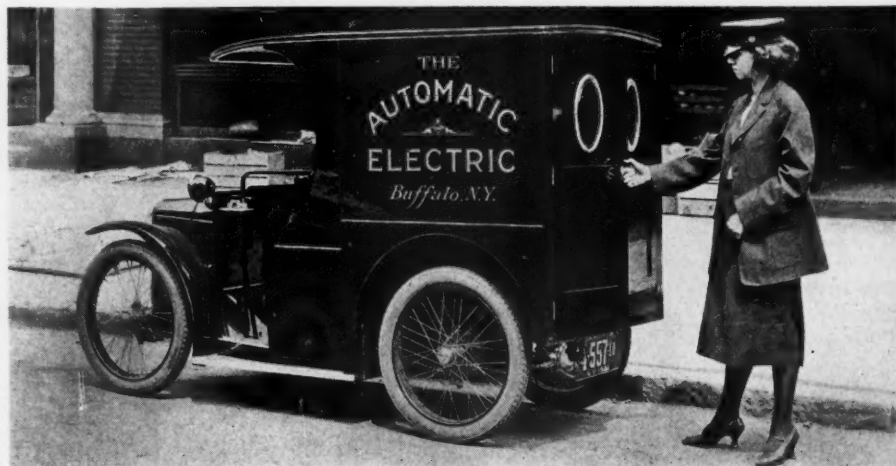
This car has a cruising radius of 50 miles on one charge of electricity at a speed of 15 m.p.h., and a load capacity of 500 lb. There is but one easy step from the seat to the curb.

The shop car model provides quick, convenient, intershop transportation.

It also has many other uses in plants, such as carrying men and materials, distributing mail, assisting paymasters, timekeepers, watchmen and others in the performance of their duties.

The size and flexibility of this car allows the driver to go anywhere about the plant. For, with its narrow tread of 35 in. and its short wheelbase of 65 in., the average factory aisles and doorways offer no barrier to its progress.

The entire expense of operating lies practically in the cost of recharging the batteries, which is but a few cents per day. A complete charging apparatus is furnished with each car without extra cost.



Novel Delivery Car for Urban Deliveries



## Standard Two and a Half Ton Hydraulic Elevated Trolley Tower-Truck

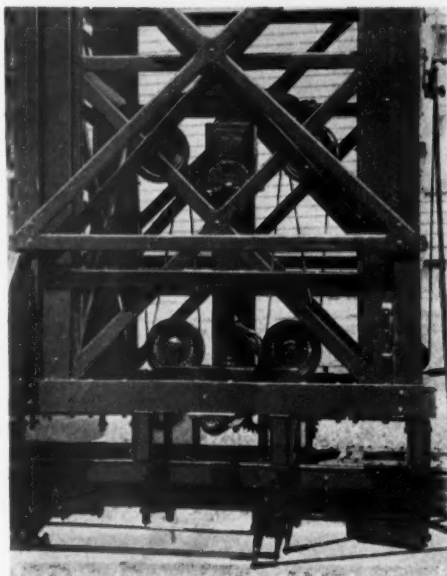
**T**HE accompanying illustrations of the Standard trolley tower truck show an unusual installation of the tower and body arrangement.

The tower can be elevated or lowered in less than a minute by moving a lever which is within reach of the driver's seat.

A three-section Trenton tower is located between the cab and body. The tower is operated by a Wood Hydraulic Hoist, located on two cross-members in the center of the tower. The hydraulic hoist is hooked up with the hand hoist arrangement, so that in case of emergency or when the motor is not running the tower can be raised easily by one man turning a crank. The tower lowers by gravity and the hand arrangement is fitted with a brake to control the downward speed of the tower.

The enclosed cab has sliding doors and is fitted with an auxiliary roof to allow the workmen to walk on it. A ladder shaped to the contour of the cab side is attached to provide means of getting on the tower platform.

The body is equipped with four longitudinal tool boxes. Two inside tool boxes are full length of the body and the two outside ones, which are longer, straddle the tower frame. Six double 8-in. hooks are attached to the body posts for hanging on coils of rope and wire, etc.



Close-up of the Tower Mechanism, It is Operated by a Special Wood Hydraulic Hoist

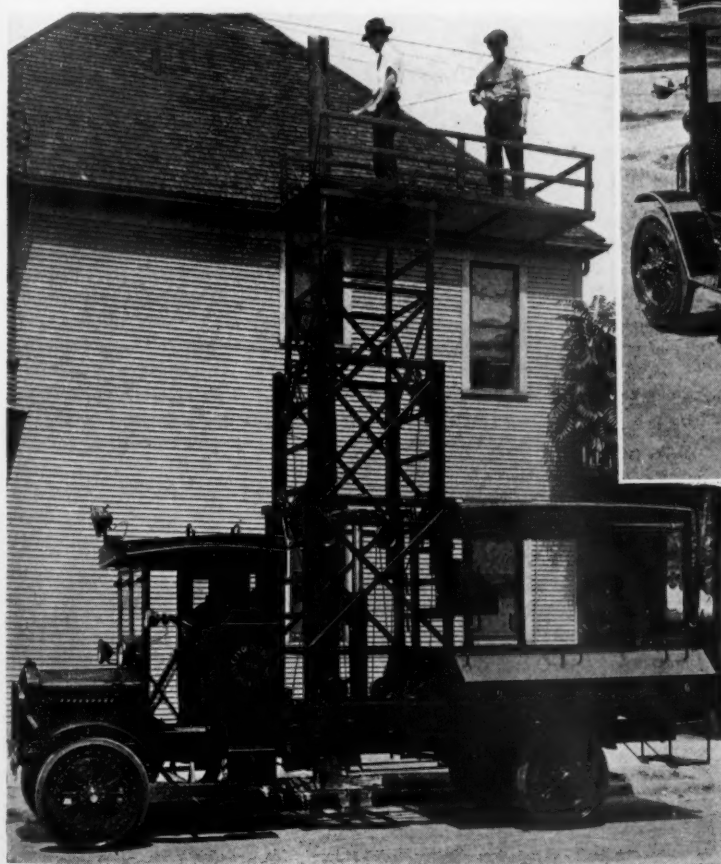
Primarily inside tool boxes, they also serve as seats for the workmen. The passageway between them has provisions for removable partitions to make four extra large compartments. Covers of outside tool boxes are on an angle, so arranged as to keep contents dry in wet weather.

A step and hand rail at the rear end of the body make it easy for workmen to get tools and material from the inside tool boxes and compartments.

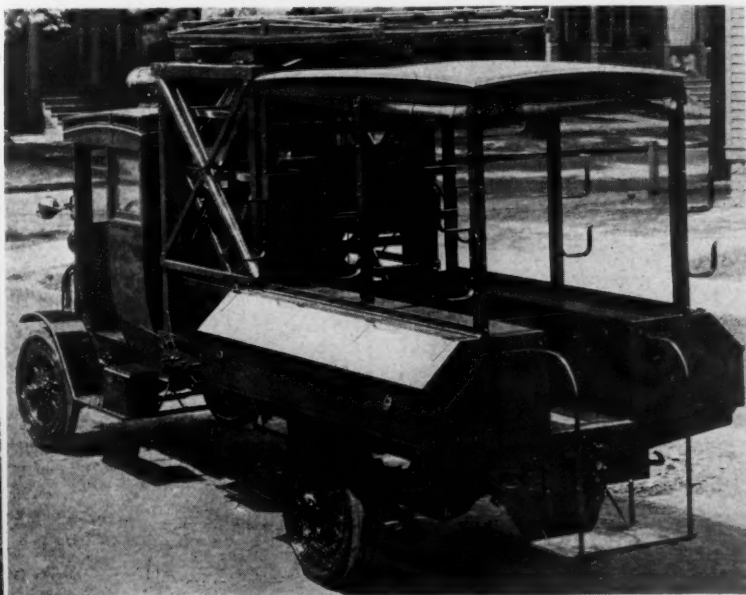
The body can be completely enclosed in inclement weather with curtains that are rolled up and attached to the top of the body. The chassis is equipped with a pintle hook and both front and rear tow hooks.

Electric lighting equipment consists of two headlights, one tail light, two dash lights, one spotlight and searchlight. The searchlight is mounted on the top of the cab and is so arranged that it can be swung in any direction to illuminate the work while repairs are being made.

The total height from the ground to the tower platform when elevated is 19 ft. 6 in.; when lowered it is 10 ft. 4 in.



Standard Trolley Tower Extended to Maximum Height



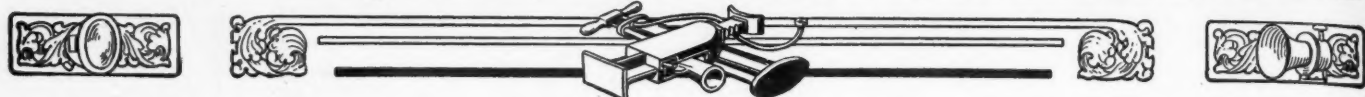
This truck is manufactured by the Standard Motor Truck Company, Detroit, Michigan.

### Correction

Above: Standard Trolley Tower Truck Fully Equipped With Enclosed Cab and Completely Designed Tool Box.

In the September number of the Commercial Car Journal, page 76, a complete description of the Hough Mechanical Hoist, manufactured by the Hough Mechanical Hoist Co., Chicago, Ill., was published. An error in typography designated the elevating height of the hoist as 20 degrees. This, as the illustration showed, is obviously wrong. As a matter of fact, it will elevate a body to an angle of 70 degrees or higher if desired.

# TRUCK EQUIPMENT AND APPLIANCES



## National Worm Drive Axle for Speed Trucks

**T**HE National Axle Co., Benton Harbor, Mich., in announcing its new type "100" worm drive axle for speed trucks of three-quarters to one ton capacity, states that the improved methods of manufacture employed and the large quantity production schedule makes practical the utilization of this axle in the assembly of a medium priced speed truck. It is stated that only the best of materials are used throughout the construction, and that this axle was designed and built by engineers of long automotive standing after much study.

Low cost of upkeep, long life and satisfactory every day service are some of the most important features claimed for this worm drive axle.

The following brief of the materials and construction will give a limpid insight as to the exact nature of the various units and their assembly:

The drop forged special alloy steel driving shafts are accurately ground, making for uniform stress throughout. The housing is a one piece casting thoroughly reinforced. These castings are machine molded and have a uniform thickness at all points.

Tested on a special machine by which the center distances can be accurately measured, the worms and wheels are all interchangeable with each other. The worm is alloy steel and the wheel special alloy steel bronze. Differentials of the 4-pinion type with drop forged gears and spiders, are standard in National axles of all capacities. The gears are of special alloy steel with heavy stub teeth. All bearing surfaces are hardened and ground and provided with oil grooves.

The worm and wheel together with

differential are mounted as a unit on a one-piece casting which forms the cover for the case. This assembly facilitates repairs, greater accessibility being afforded upon the removal of a complete unit. Timken roller bearings are used throughout.

Two pairs of internal expanded brakes provide an unusually large amount of braking surface. All openings are equipped with special felt washers to prevent oil and grease from creeping out of housing. Provision has also been made to prevent any dirt from working into the bearings.

Special attention is called to the lubrication of the worm and wheel. An oil

groove cast on the side of the worm mounting casting carries oil direct in a continuous stream to both worm shaft bearings. An old oil and sediment plug is provided in the bottom of the housing. An intermediate, "danger oil level plug," is also provided. This plug is located a little below the oil firing opening. Oil should not be permitted to sink below this point. The top plug is the filling point.

Ratios: 5 to 1, 6 1-10 to 1, 7 $\frac{3}{4}$  to 1, and 8 2-3 to 1. Centers: 6 in. Tread: 56 in. Spring centers: 34 in. min. and 40 in. max. for 3-in. springs. Spring clip hole, front and back: 4 $\frac{3}{4}$  in. Worm shaft end: 1 $\frac{3}{4}$  in. S. A. E. standard taper.

## Simpson Flexeco 30, a Vaporizer

**T**HE Pyrene Manufacturing Co., 17 E. 49th St., New York City, makers of Pyrene Extinguishers, has completed a series of experiments with a gasoline saving device for the Holley carburetor used in the Ford.

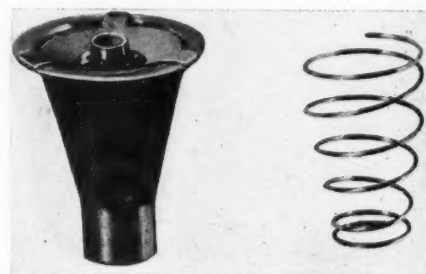
It is named the Simpson Flexeco "30." The object of the device is to break the gas up into the finest possible vapor, and thus improve the operation of the engine.

This device automatically regulates the gas mixture, so that maximum efficiency and gasoline saving is being obtained at all times. An increase in mileage of from 30 per cent to 50 per cent is claimed to be obtained; in fact, the company gives an unqualified guarantee of 30 per cent or more.

When all these features were proved to the satisfaction of the Pyrene Co., it sent

the device to various technical colleges for tests by disinterested authorities.

The Polytechnic Institute, Department of Mechanical Engineering, concluded a

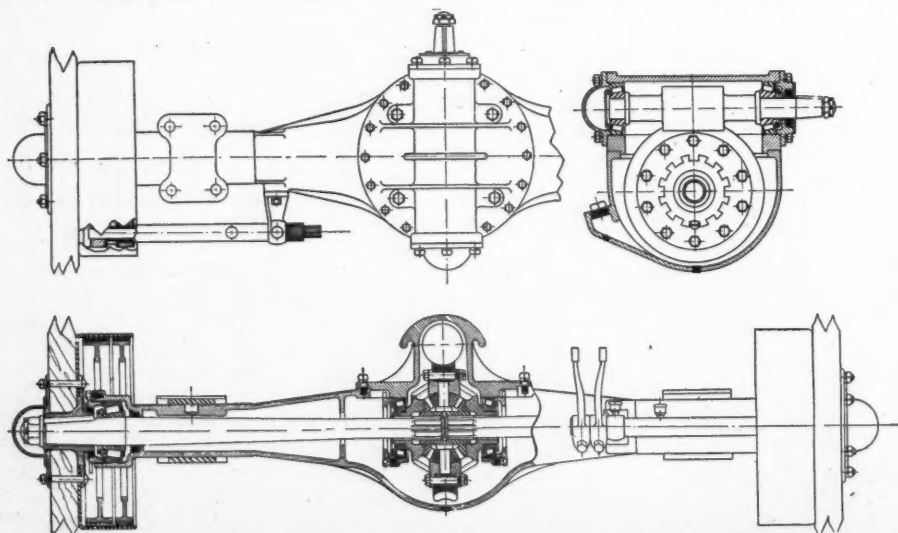


Showing the Two Main Units of the Simpson Vaporizer

series of Ford road tests with a Holley carburetor equipped with and without the new device. The comparative figures show an average increase of 30.8 per cent in mileage and such other improvements as greater smoothness, better acceleration and ability to idle at as slow a speed as four miles an hour.

This device consists of a brass cone-shaped device and a spiral spring. At 20 m.p.h. the position of the attachment in the carburetor is such as to permit some vapor to pass up through the chamber inside the cone, and more vapor to whirl up around the outside of the cone. The vapor passing through inside of cone is thoroughly broken up by slot-shaped ports. The vapor passing up on outside of cone is broken up by whirling motion and by the striking deflecting flange at top of cone.

At speed greater than 20 m.p.h., the cone lifts still higher on the needle valve



Plan and Sectional View of the New Type 100 National Worm Drive Axle for Speed Trucks



stem, due to increased suction from the motor, and allows an additional amount of vapor to pass up around outside of the cone.

At slow speed, the spiral spring holds cone down so that the flange at top of cone rests on the shoulder of carburetor chamber, thus closing the opening around

cone and forcing vapor to pass through inside of cone. Suction is the sole agent that actuates the automatic regulatory movement of the cone.

# Russel Adds New Models to Its Line

THE Russel Motor Axle Co., Detroit, Mich., which is one of the divisions of the McCord Manufacturing Co., Inc., well-known radiator manufacturers, has, during the depression of the past year, been working on new designs of internal gear axles. The development work is completed, and its new models are now in production. All of these models possess the same characteristics and have many improvements.

The new models will be made for the following size trucks: 1-ton, 1½-ton, 2-ton and 2¾-ton. With the exception of the 1½-ton, they replace the former P, S and U axles. The 1½-ton model is, however, an entirely new model and is intended to take care of the demand that many truck builders have felt recently.

For special speed truck equipment the 1½-ton axle is supplied with 16½-in. brake drum with a gear ratio of 6.33:1, while on the model 3000 axle a 15½-in. brake drum with a gear ratio of 6.5:1 is supplied.

The accompanying mechanical illustration, with the exception of the dimensions, applies to all models. The improvements possessed by these axles may be briefly summarized thus:

Spiral bevel driving gears are used on all models. This construction is claimed to give a greater degree of quietness than obtainable in straight teeth construction.

On models 3000, 4500 and 6000, the pinion shaft is machined with 10 splines for the universal joint flange. The model 8500 axle has a taper for the flange. On all models an improved 4-pinion type of differential is used. Hardened and ground thrust washers are used.

The jackshaft pinions are mounted upon the jackshaft in such a manner as to permit removal without disturbing the jackshaft. An enclosure for the jackshaft pin-

bearing is provided. An enclosure for the internal gear and jackshaft pinion is fitted to protect these parts from dirt, and also retain the lubricant.

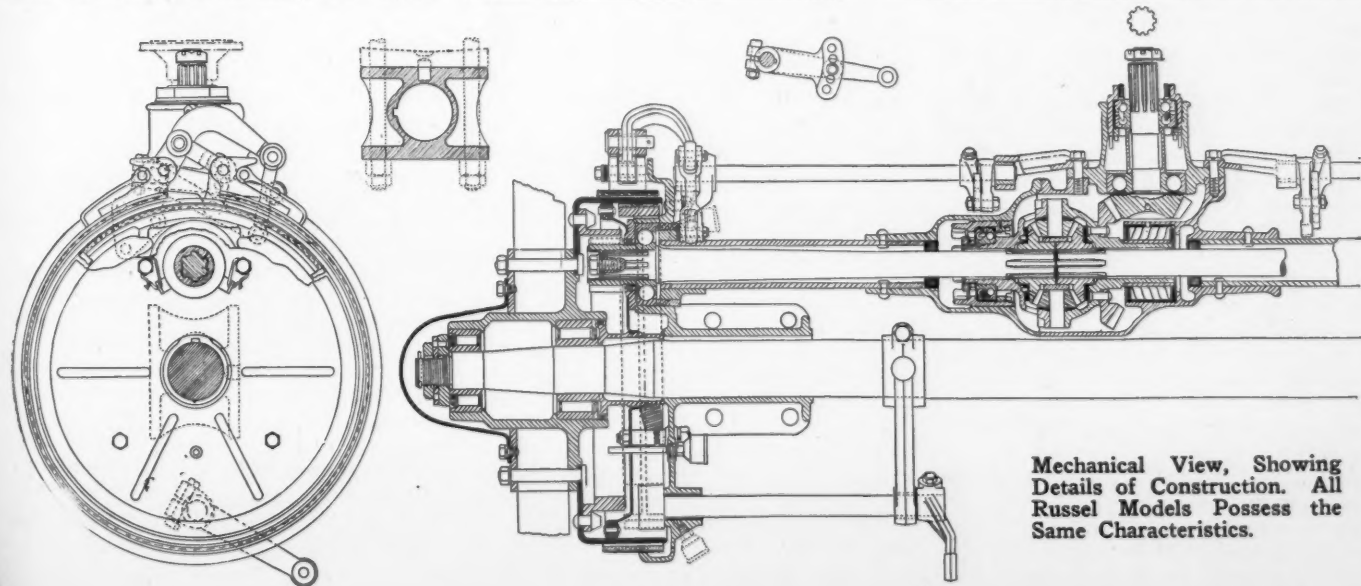
The operating mechanism for the external brake is improved, and an adjustment for the brake lever is provided. Provision for adjusting the wheel bearings is also fitted. This is in accordance with the recently adopted S. A. E. recommendations.

In addition to the new designs, a great deal has been accomplished in obtaining

greater production with improved workmanship. It is reported that the company's treating facilities have been more than doubled; special equipment has been installed; machinery has been rearranged to reduce excessive handling. The reduction of operating costs incident to these changes is said to have been sufficient to permit the company to sell the improved axle at a price no higher than was necessary for the former models.

The complete specifications of these axles are given below:

	3000	4500	6000	8500
Nominal capacity in tons .....	1	1½	2	2¾
Weight, less wheels .....	450 lbs.	575 lbs.	656 lbs.	735 lbs.
Maximum weight on spring pads..	4500 lbs.	6500 lbs.	8000 lbs.	11000 lbs.
Maximum torque input in inch	7:1-5000	7.45:1-8250	7.4:1-8250	9.3:1-10000
for different gear ratios .....		6.33:1-8500	8.8:1-6950	
Internal gear and pinion .....	6 Pitch	5 Pitch	5 Pitch	4½-6 Pitch
	1¼ Face	1½ Face	1¾ Face	1¾ Face
Bevel drive gear .....	4-5 Pitch	4½ Pitch	3¾ Pitch	3¾ Pitch
	¾ Face	1 Face	1½ Face	1½ Face
Differential .....	4 Pinion	4 Pinion	4 Pinion	4 Pinion
Dead axle				
Outer spindle diameter .....	1¾	1¾	1 49-64	2
Inner spindle diameter .....	2	2½	2¾	2¾
Spring seat diameter .....	2¼	2½	2¾	3
Bevel pinion shaft				
Diameter .....	1¾	1¾	1¾	1¾
Universal joint fitting .....	1½-10 Spl.	1½-10 Spl.	1¾-10 Spl.	1¾ Taper
Hubs				
Barrel diameter .....	4¾	4¾	5½	5½
Flange diameter .....	9¾	11¼	11½	11½
Bolt circle diameter .....	8¾	10	10	10
Brakes				
Service—Diameter .....	14	15½	16½	18
Service—Width .....	2½	2½	3	3
Emergency—Diameter .....	13½	15	16	17½
Emergency—Width .....	1¾	2	2	2
Bearings				
Bevel Pinion—Outer N. D.....	306	306	307	308
Bevel Pinion—Inner N. D.....	1406	1406	1407	1408
Differential—Right hand Hyatt .	26219	18367	26084	26084
Differential—Left hand N. D....	208	209	210	210
Jackshaft Pinion—N. D. ....	1406	1406	1407	1407
Wheel—Outer Bower .....	336TL	3554T	309N	4554T
Wheel—Inner Bower .....	4554T	4553T	5551T	5553T

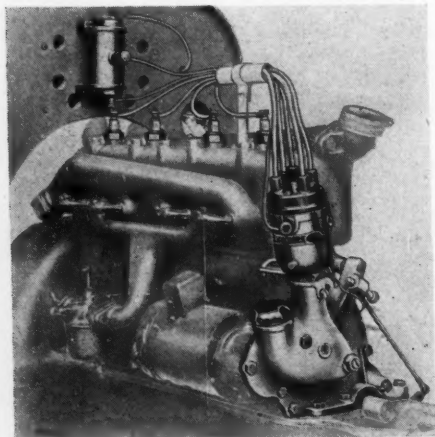


## Bosch Battery Ignition System for Fords

Closely following the announcement that the makers of the Bosch Magneto were prepared to supply Battery Ignition Systems for automotive engines comes the news that the same firm is now manufacturing a remarkably efficient Battery Ignition Outfit for Fords.

This outfit is a simple but ingenious system. In designing it, the Corporation's engineers put Ford engines on the test bench and, with the aid of dynamometers, plotted the curve of spark advance which should be followed to develop greatest efficiency at all engine speeds from starting to maximum. They then designed the Bosch Compensating Governor so that it would regulate the spark advance, making it follow that curve without any assistance whatever from the driver.

The only time that the driver has to touch the spark lever is to retard it when starting, advancing it to the best running position as soon as the engine is operating. After that he may drive slowly or at top speed, up or down hills, over smooth roads, or through deep sand, without having to touch the spark lever. The Compensating Governor times the spark



View Showing Installation of the New Bosch Battery Ignition System for Fords. Every Unit of the Outfit is shown

to secure greatest efficiency from the engine under the load being put on it at that moment.

The Bosch Coil, built of the high grade materials, is wound just as carefully and insulated just as well as Bosch Magneto armature windings. The spark it produces is intense. Although the standard spark test gap is five millimeters in width, this system is claimed to throw a spark over twelve millimeters, even at the highest Ford engine speed.

The Bosch Interrupter, or Contact Breaker, is simple and durable. It is properly adjusted at the factory and need not be altered until the engine has gone many thousand miles. When an adjustment is to be made, it can be done quickly and easily without throwing out the timing of the spark.

The Bosch Battery Ignition System is said to have these advantages: First, it develops maximum efficiency at all engine speeds. Second, it makes the engine op-

erate smoothly, regardless of speed. Third, it gives additional economy through a saving in gas, oil and wear, also reducing the drain on the battery through easy starting. The intensity of the spark is asserted to insure a rapid and complete combustion of the gas in the cylinders. There is no waste of gas through misfiring, no necessity for rich mixtures and no heavy consumption of oil.

Fourth, it gives added power, due to increased efficiency of the engine. This makes the car faster on the open road, a better hill climber and more powerful in the sandy stretches. Fifth, it makes the engine more dependable, start more easily and operate more efficiently.

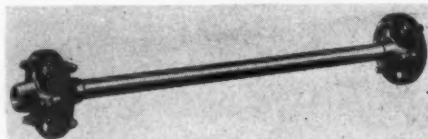
## Snead Cushion Drive Shaft Units

Through the use of electrically heat treated nickel alloy steel tubing of light gage, Snead Cushion Drive Shaft Units, manufactured by Snead & Co., Jersey City, N. J., are exceptionally light in weight. The tubing used has a thin wall but a greater tensile strength and higher elastic limit than that provided by medium carbon steel tubing.

It was used extensively during the war period by aeroplane manufacturers for shafting, landing gear struts, braces, etc. The introduction of this tubing into the automotive industry met with almost immediate success because of its light weight and great strength. These features made it a decidedly important factor in the development of a thoroughly efficient propeller shaft unit for cars, motor trucks and tractors.

The Snead Cushion Drive embodies the flexible disk type of universal joint. Forged steel spiders are driven on either end of the tubing. A hexagonal wedge-shaped plug is then driven into the end of the tubing, forcing the end of tube into a hexagonal shaped recess on the inner side of the forging. The three component parts are then arc welded together. This is said to result in a positive method of attaching tubing to spider forgings.

No spline or slip joint is asserted to be necessary with the disk joint, as the end



Great Tensile Strength and High Elastic Limit Claimed for This Drive Shaft

movement along the shaft as well as the motor power is absorbed through the flexible rubber and fabric disks.

Two additional forged steel spiders are used at either end of the shaft in place of companion flanges. The disks are bolted to the spider feet with spacing washers between each to insure proper gripping of the fabric disks.

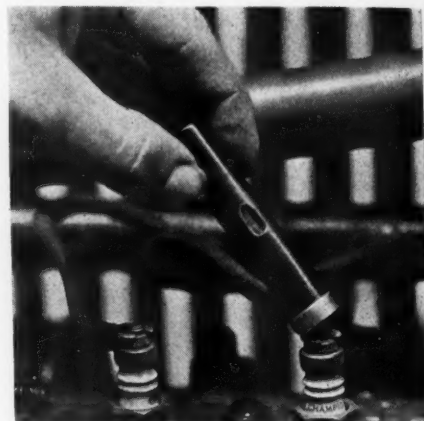
The joints require no lubrication, are noiseless in operation, and by absorbing motor impulse and shock along the shaft, they are claimed to result in much longer life in engine, transmission and axle gears and bearings.

## Airco Ignition Gage

The Airco Ignition Gage is a compact vest pocket instrument about the size of a man's finger. It enables any motorist to detect instantly faulty spark plugs, and to locate short-circuits and leaks of current in the wiring between the plugs and the coil, or magneto.

The gage consists of an insulating hard rubber shell into which is packed a sensitized tube of Neon. Neon is an element of air, small in comparative quantity, and a very active conductor of electricity. When the metal cap, which permanently seals one end of the gage, is brought into contact with a high-tension electric current, the Neon becomes luminous and emits flashes of orange-red light, visible through the indicator in the side of the case.

To operate, hold the rubber end of the gage between the thumb and fingers and touch the metal end to the top of the spark plug, while the engine is running. From the frequency, regularity and comparative intensity of the orange-red light in the gage, the condition of the plug and its working efficiency can be determined. Apply the gage to each plug in turn and compare the indications as follows:



Manner in Which the Airco Ignition Gage is Employed in Determining the Location of Trouble

No flash—plug foul, or no current. Irregular flash—plug missing fire. Dim flash—plug partly foul or broken. To determine which condition exists, slowly withdraw gage from top of plug. If flashes cease at once, spark gap is too narrow, indicating partly foul plug. If flashes persist when gage is half inch or more away, look for broken plug—particularly broken porcelain. Bright flash—plug and circuit O. K. Very intense flash—gap too wide.

If the flash remains dim when the spark plug is known to be in good working order, it indicates lack of compression in the cylinder. Sparks are always hotter and indications from the gage brighter, if cylinder compression is high.

The Airco Ignition Gage is manufactured by the Air Reduction Co., New York City, and sales are handled by the Edward A. Cassidy Co., Inc., 25 West 43rd St., New York, N. Y. The price is \$1.

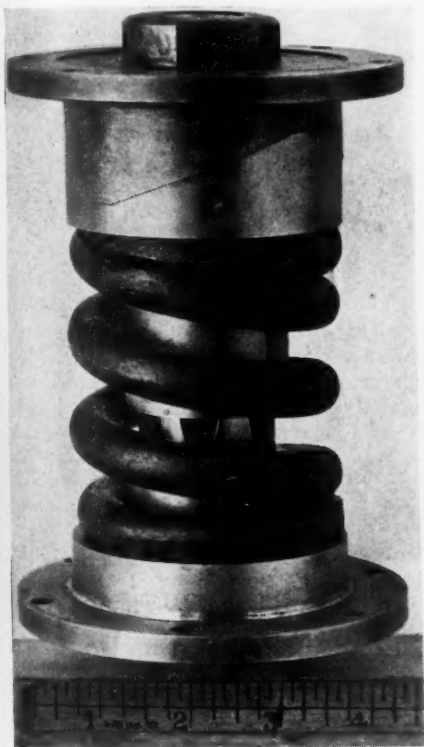


## Flexo Mechanical Torsional Equalizer for Propeller Shaft

The Flexo Torsional Equalizer offered by the Flexo-Motive Corp., McCormick Bldg., Chicago, Ill., is a new form of spring drive for cushioning the transmission mechanism against shock. No matter whether the torque is right or left, from engine, or drive wheels, this coupler will render the operation of the machine softer, smoother and more flexible.

The Flexo equalizer is adaptable to any make car or truck. Successful performance is assured by reason of the fact that it consists of but few parts and that it is self-contained and enclosed and can be loaded with grease when loaded.

The mechanism consists of a splined shaft over which a sliding collar is fitted.



By Studying the Illustration and the Accompanying Description the Principle of the Flexo Equalizer Will be Readily Understood.

The shaft and collar therefore turn together at all times, but the collar may move along the shaft. Between the two is a stout helical spring which is compressed by the movement of the collar. A second flanged collar is mounted on the end of the shaft and left free to turn on it. Its inner face carries a face cam, corresponding in form with a face cam on the outside of the first mentioned collar. Hence, as the outer collar is rotated with respect to the shaft it causes the inner one to move longitudinally, thus compressing the spring by an amount proportionate to the relative rotation of the parts. The single coil spring assumes the entire work of softening shocks.

The parts allow an angular displacement of 70 deg., within which the spring is compressed 13-16 of an inch.

Thus equipped not only does a car or

truck start more easily, regardless of the speed of clutch engagement, but it seems to roll more quietly. At a standstill with the low gears engaged the clutch may be dropped in without stalling the engine. Again, it is possible to reverse the car from a slow back speed to a forward course by slamming in the clutch without stalling the engine or without perceptible shock.

## Schmidt Motor Truck Traction Devices

The Charles D. Schmidt Co., Inc., Broadway, corner Canal St., New York City, in offering its patented unit anti-skid devices is really offering a unit permitting three positions of wear. These units may be placed on a wheel to form unit anti-skid devices anchored, a semi-floating anti-skid device anchored and a full-floating anti-skid device. The first two assemblies are, because of the nature of their attachment, positively safe against loss in event of a broken unit.

Multiples of a unit for a given size of tire may be assembled to form the various combinations for the given tire or wheel.

One Schmidt unit consists of a chain, the length of which is determined by the size of the tire to be equipped, and two patent-



Schmidt Chain Units Arranged for the Anchor Type of Assembly

ed hooks, so designed and constructed to provide a quick means of attaching the chain units and to prevent their accidental disengagement. The peculiar formation of the hook is said to protect the tip from injury and prevent the escape of the link in which it is hooked. The hook is made of dropped forged steel.

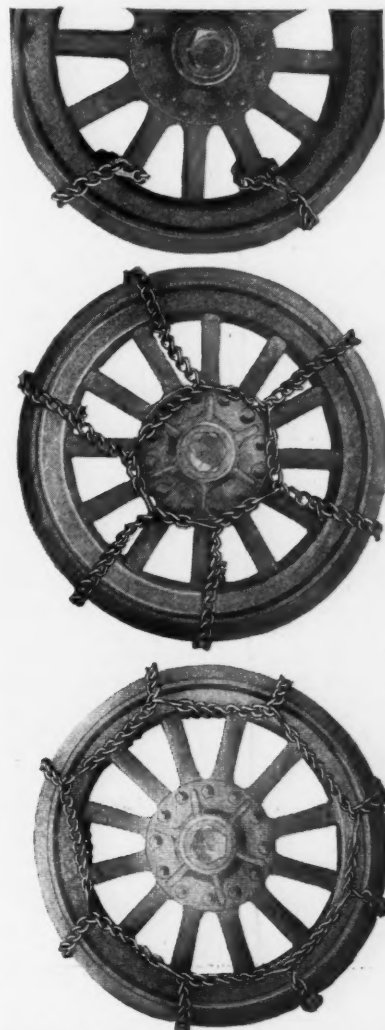
In the first type of assembly the anchored units may be used in any desired number. One may be placed at each spoke, or alternate spoke according to the service desired or necessary. The only part subject to wear is the traction part between the tire and the road. When the traction section is worn the position of the chain may be reversed to throw the wear on the other end. The units are readily attached or detached and may be shifted to different positions on the wheel so as not to bring undue wear on the tire at any given point. Automatic adjustment is claimed to give proper chain grip without injury to the tire.

Six units are generally employed in the semi-floating type of assembly, although more may be added if desired. Worn chain parts may also be reversed in this assembly. The maker points out that the ring on the side of the wheel around the hub prevents the hooks from creeping toward the tire tread. The feature of this

assembly is that should the chain break at the tread, the side ring will hold the pieces throwing them to the outside of the wheel away from running gear.

The full floating type is suited to disk wheels particularly and are said to have the advantage of detaching at any part. When once assembled they may be retained in that form. This ring, also, prevents hook creeping. The full-floating type of assembly is devised where brake rod or other parts are too close to the wheel to give sufficient clearance.

Schmidt chains may be utilized for a number of other purposes, such as: sling



Showing Schmidt Anti-Skid Units Assembled in Three Positions of Wear. They Are: Upper, Anchored Type; Center, Semi-Floating Type, and, Lower, Full-Floating Type.

chains, tow chain, mud chain, pull out chain, tail-board chain, rung chain, loading chain, and hoisting chain. The units can be made into endless chains or chains of any length.

These chains are offered in any size for any service. The list prices per unit for solid single tires range from \$1 for a 3-in. tire to \$2.60 for a 14-in. tire; and for solid dual tires from \$1.30 for a 2½-in. tire to \$2.60 for a 7-in. tire.

This company also manufactures heavy-service brake lining made of pure asbestos and interwoven with brass wire in standard and special sizes, as well as heavy-service disk clutch facings.

## Service Associations Launch Plan to Advertise for Winter Business

**S**ERVICE Station Managers, as well as the proprietors of the independent repair shop and garage, realize that the average owner defers adjustments and repairs, or a general overhaul, until conditions actually require the work. While this is particularly true of the passenger car the owners of which delay until late winter or early spring, it is a condition that may be said to obtain with the truck.

### Old Overhead Keeps on Working

The service manager building up an efficient staff of mechanics and installing time and labor-saving tools, machinery, etc., finds it necessary to lay off men in dull season because the overhead must be reduced. These men have become, let us say, efficient with particular model or models and are, consequently, enabled to turn out better work and at less cost to the owner. Those laid off are later replaced by new men who not only have to become familiar with the units, but being largely of the floating type are not as efficient as the workman throughout the year.

With full knowledge of these conditions plus the desire to maintain the service station, repair shop and garages at normal, N. W. Durnin, a director of the Automotive Service Association, of Brooklyn, N. Y., brought before that organization a plan to sell truck and passenger car owners on the vital necessity of having necessary and other work performed during the fall months. The plan is a simple one. It consists of ADVERTISING, PLUS SELLING, which, after all, are the fundamentals of business. In brief, Mr. Durnin sold his fellow directors on the plan to start not less than a two months' advertising campaign in two of the leading newspapers in Brooklyn.

### To Advertise Service to Educate

Twenty 600-line advertisements are to appear and to alternate in the newspapers. The copy is to be changed and will contain a punch to attract the owner of the truck and passenger car. The copy will also be educational and will endeavor to sell the owner on the need of consulting the service station as to work required on his car. These quarter-page advertisements will carry no name other than the Automotive Service Association of Brooklyn.

The expense of the campaign has been met by 40 dealers, service stations, repair shops, etc., entering into a contract with the association to pay \$75 each as per the agreement reproduced herewith. Each subscriber is to be supplied with 1000 folders or circulars, which are a follow-up to the advertisements, and which bear the emblem of the association, and have space for the subscriber's name and address. These folders are a two-color job, and those proposed carry a punch and

arguments that should attract the attention of the owner. As non-members participate in the plan these practically carry the endorsement of the association.

The Brooklyn association is to be congratulated for the speed with which it put over the campaign. The morning following the meeting teams of two men each called on the dealers, etc., and in less than 24 hours the campaign went over, and went over big, as those sold were enthusiastic over its possibilities.

The contract between the subscriber and the Automotive Service Association is as follows:

**We hereby join you in the proposed advertising campaign by your Association, understanding that it is to be co-operative and for the benefit of members of the Association and non-members, its purpose being to educate car owners and seek to have repairs and adjustments made during the Fall rather than the Winter, and to establish a pleasant business relation between the car owners and members of your Association and the trade in general, from which mutual benefits may be derived.**

**We subscribe the sum of \$75 for that purpose, \$25 of which is herewith enclosed, and agree to pay the sum of \$10 each week for five succeeding weeks, for which you are to deliver to us 1000 printed circulars (like sample exhibited to us) free of charge, and will agree to sell us any number of additional thousand copies at \$5.75 per thousand for distribution to our customers during the advertisements appearing in Brooklyn Daily Eagle and Brooklyn Standard Union. You are to expend the sum of \$3000 in such advertising campaign by insertion of Twenty 600-line advertisements in those papers, Ten 600-line advertisements in each.**

**All monies subscribed over the necessary amount of expenditures will be returned to us pro rata.**

### New York Association Considers Plan

On Thursday evening, October 6, the Automotive Service Association of New York considered the advertising plan at its monthly meeting. N. W. Durnin explained how Brooklyn put it over, and he was followed by the agency representative preparing the copy and folder. Samples were displayed. The Executive Committee of the New York association had gone over the campaign previous to the meeting, and after some discussion it was decided to authorize the committee to work out details, etc. It is probable that the committee will appoint teams and that the sum to be expended on advertising will not be less than \$12,000. Frank Prestos, Packard Motor Co., New York, read a paper on Parts Department Control. The next regular meeting will be held November 3.

The Automotive Service Association of Newark began its season's work with a record-breaking attendance at its September 15 meeting. Plans were discussed for fall and winter work, after which the members listened to an address of C. M. Radley, of the Oakley Chemical Co., maker of Oakite. He gave a very interesting talk on cleaning problems, and at the conclusion questions were asked by the members and answered by the speaker, and by J. F. Tonn and A. P. Hinton of the same company.

The next meeting will be held October 20 and will be an open meeting at which there will be a discussion of insurance problems by an insurance expert. Effort is to be made to secure a film, also entertainers, for this meeting. The November meeting occurring on the 17th, will be given over to the annual fall dinner.

### Pirate Parts to be Discussion at Next Service Convention

The fifth semi-annual meeting of the service managers of truck, passenger car and tractor factories will be held in New York City, November 15 and 16, unless the dates are changed by the committee which is in session at Cleveland at the time this article was written. There is every reason to believe, however, that these dates will stand.

Secretary Cobleigh of the N. A. C. C. is working strenuously in preparing a program, and it is believed that the meeting will be even better than the event held at Buffalo last fall. Instead of reading a large number of papers it is proposed to have more open discussions on subjects dealing with service and its various angles. It is expected that such a program will produce results.

One of the subjects that will be threshed out will be "pirate parts." The increasing use of parts other than those of the manufacturer of the truck and passenger car, to say nothing of equipment products, is viewed with alarm by the manufacturers and by the factory service managers. Some allege that the dealers are having component parts, such as piston pins, axle shafts, pinions, gears, etc., manufactured by other than the parts makers. Some dealers claim that they can secure equally as good component parts at a cost much less than the factory price. This enables the dealer to make a greater profit, for invariably the factory list price of the part is charged the customer, say the factory service men.

There is no denying the fact that the use of parts other than those made by the parts maker for the truck manufacturer and passenger car maker is a problem that must be given serious consideration by the manufacturer. If the dealer or owner used parts equally as



good in so far as material, workmanship and limits were concerned the problem would not, perhaps, be so serious, but it is stated that much inferior material, a price product, frequently finds its way into the chassis, and, not giving proper service, reflects upon the product of the truck maker.

It may be that some attempt will be made to define what is a pirate part at the meeting next month, which, if attempted, will prove interesting, as opinion differs on this subject. Irrespective of the definition arrived at, there is this thought, and that is, that service is one

of the factors responsible for the use of other than genuine parts, and that shortage of parts during the war developed or increased the use of parts other than those supplied by the truck and car maker.

Indications point to a well-attended meeting, as more manufacturers appreciate the value of service and its relation to sales than formerly. If the plan of fewer papers and more open discussion of timely and pertinent subjects is adhered to, the meeting should prove the most interesting of any held by the men who are connecting link between dealers and factory in the replacement business.

Akron and vicinity, where there are some fearful and wonderful buses in operation.

The traction officials state that these buses will cost \$7500 each.

Operation of these pioneers in the field of combined bus and street car transportation will be watched with keenest interest by both motor truck manufacturers and traction interests, and it is not too much to believe that this first installation is but the forerunner of hundreds of similar installations all over the country.

### Correction

#### (Truck Grip Chains)

In the description of the Truck-Grip Chain Co., Inc., 2 Columbus Circle, New York City, product, known as Truck Grip chains, which appeared in the September issue of the Commercial Car Journal, page 39, a discrepancy in price was inadvertently made. The following price list is correct:

#### For Solid Single Tires

3½ in.	\$16.00	1	Ton	5-16 in.	Chain
4	"	18.00	1½	"	5-16 " "
5	"	21.00	2	"	11-32 " "
6	"	23.00	2	"	11-32 " "
7	"	25.00	2	"	11-32 " "
8	"	27.00	3	"	3-8 " "
10	"	30.00	3½	"	13-32 " "
12	"	32.00	5	"	13-32 " "
14	"	40.00	7	"	7-16 " "

#### For Solid Dual Tires

3½ in.	\$22.00	2	Ton	11-32 in.	Chain
4	"	25.00	2	"	3-8 " "
5	"	30.00	3	"	13-32 " "
6	"	35.00	5	"	13-32 " "
7	"	40.00	7	"	7-16 " "

A set of Truck Grip chains consists of two retaining rings, 12 U-bolts and 12 cross chains, each having two snaps.

These chains are featured because of the ease and facility with which they can be snapped on a wheel without the use of tools, or without moving the vehicle. Quick replacement of broken links is another feature. A large reduction in tire wear and the securing of low chain up-keep is said to result from the creeping of the chains between the spokes. This is claimed to be a characteristic peculiar only to Truck Grip chains.

## Traction Co. Buys Motor Buses

### Akron Street Railway Company Pioneer in Combined Bus and Railway Venture

By A. V. COMINGS

**O**RDERS have been placed by the Northern Ohio Traction Co. for twelve motor buses to be used as an integral part of the street car system at Akron, Ohio, where they will be run on routes radiating from the outer terminals of the present city tracks.

This is the first time in the history of automotive transportation that an electric street car company in the United States has purchased motor buses and made them an integral part of its transportation system, and it marks an epoch in the history of the motor truck. Of privately owned buses there have been many, and traction interests have united in doing everything they could to either stop their operations or divert them to routes where they would not be in competition with their own cars.

Evidently the Northern Ohio Traction Company officials have seen the futility of trying to stop a method of transportation that has come to stay, and are therefore adopting it as their own.

Akron built up wonderfully during the war period, and today has a number of suburbs lying on the very edge of the city which are not served by car lines. Cost of building into these suburbs from the terminals of existing lines has proved prohibitive under present conditions, and so the electric line officials have decided to bring these residents into touch with their city lines with the motor buses.

The fare on the buses will be the same as on the street cars, and transfers will be issued to bus passengers entitling them to ride anywhere on the city cars.

The transfer privilege will make competition prohibitive, as private motor buses, unable to give transfers to the street car lines, could not secure enough business to keep them in operation.

The new buses will be of the very latest type, and contracts have been placed with the C. G. Kuhlman Car Co., of Cleveland, for the vehicles. The Kuhlman company has long been one of the foremost manufacturers of electric street cars in the country, and its officers have

decided that there is a future in the motor bus business and are planning to enter this field in so far as the construction of bus bodies is concerned.

The buses will be mounted on White motor trucks, equipped with pneumatic tires throughout. The body will be of steel throughout, and will be designed along the line of the Peter Witt one-man street car.

There will be four crosswise seats on either side of the center aisle, with the remainder of the space at the sides fitted with seats running lengthwise of the body. A curved seat will extend across the rear.

The entrance and exit doors will be forward on the right side, operated by the driver, who also acts as conductor. An emergency exit door is at the rear left-hand corner, opening to the side. This is for use in case of fire or accident blocking the forward door.

Twenty-five passengers may be seated in the bus, with standing room for several more.

The bus throughout will be fitted like the best type of modern street cars, and it is expected that they will set a new standard for other bus operators in



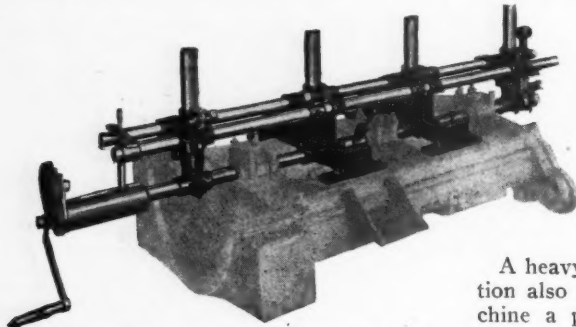
Type of Bus Taken Over by the Akron Traction Company

## Service Station and Repair Shop Appliances

### Peters Universal Bearing Reamer

Peters, Inc., Widener Bldg., Phila., Pa., is offering to the trade a reamer that is universal for all types of engines. The maker points out that the design is such as to permit the reamer to be positively held in a definite position or alignment in relation to the timing gears. Its adjustments are claimed to be practically fool-proof.

The boring bar is of the fly-cutter type and the adjustment of this cutter is deter-



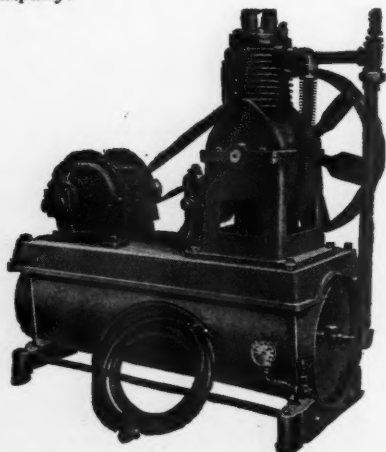
Showing How the Peters Universal Bearing Reamer is Mounted

mined by a special micrometer, which is furnished specially for this purpose. The cutter used is of ordinary  $\frac{1}{4}$ -in. tool-steel stock and it is also equipped with a jig for reaming connecting rods.

This reamer is also well adapted for such work as rebabbiting main and connecting rod bearings. The price is \$250.

### Curtis Two-Stage Air Compressor

The new Curtis style "V" stationary two-stage motor-driven air compressor, put out by the Curtis Pneumatic Machinery Co., St. Louis, Mo., embodies the same fundamental features contained in this company's single stage compressor. This model is representative of the new line being produced by this well-known company.



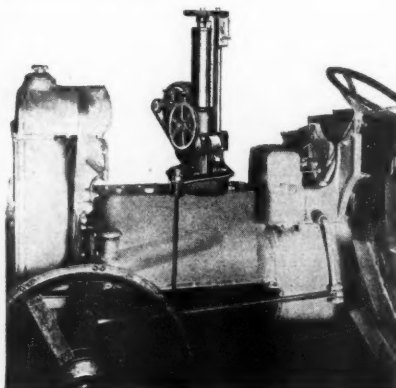
Curtis Style V Air Compressor

### Storm Motor Driven Reboring Machines

The new Storm motor driven cylinder reboring machine, offered by the Storm Mfg. Co., 406 6th Ave., S., Minneapolis, Minn., is designed to meet the requirements of the average size garage where electricity is available.

Machine is of heavy and rigid construction throughout. It is used with Storm power machine cutter heads. The heads are supported by a rigid, hardener steel bar, ground to exact size. Heavy machine bearings support the bar. These bearings are adjustable so as to take up any play and can be easily kept in perfect adjustment. Cutter gears are used throughout and a heavy internal feed screw and feed bar. Total capacity is  $2\frac{3}{8}$  to 6 feet. Weight, about 300-lb.

A heavy base not shown in the illustration also is provided for making the machine a permanent and convenient shop fixture if desired. Yet, it can be used independent of the base.

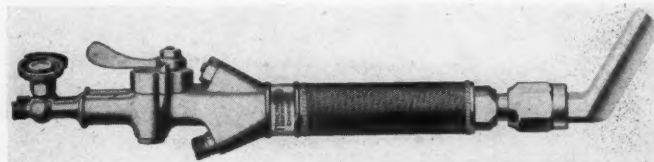


Storm Reboring Machine Prepared for Work

The machine is furnished for boring only or for both boring and burnishing. The burnishing head consists of a hardened steel arbor having a special shank to fit boring bar, surrounded by special tool steel rollers held in special roller housing.

In using the burnishing heads, the cylinders are first bored slightly under the desired finished size. After all the cylinders of the block have been bored to this size the cutter head is removed and the burnishing head is substituted. The rollers work in oil and pass through the cylinder, compressing the metal by crowding it back, thus giving the cylinder walls a hard and polished smoothness.

Machine Welding Torch With Special Tip for Metal Welding.

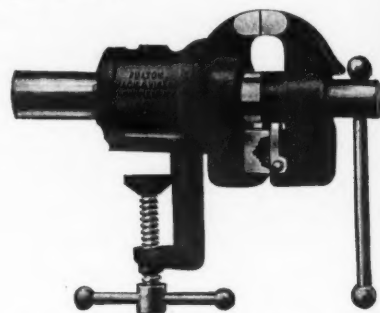


### F. & R. Combination Special Vise

The F. & R. Combination Special Vise, manufactured by Fulton Machine & Vise Co., Lowville, N. Y., because of its wide adaptability, could well be termed an all-purpose vise. Its combination of jaws and shear and its many adjustments for various types of work are its big features.

Two sets of jaws are provided for use on round and square work. Either set of jaws can be used on top or at any angle, and locked.

It is highly finished with gloss French gray enamel.



F. & R. Combination Special Vise

### Bay State Wrench Set

The wrench outfit offered by the Bay State Pump Co., Boston 27, Mass., designated as set No. 10, consists of five hex broached steel sockets with an L handle and a waterproofed bag with snap fastener. The sizes of the sockets are as follows:  $\frac{1}{2}$ , 19-21, 21-32, 23-32, and 25-32. The price is \$1.50 per set, and the shipping weight, 1 lb., 7 oz.

### Machine Welding Torch With Special Tip

The Torchweld Equipment Co., Fulton & Carpenter Sts., Chicago, Ill., makes the announcement that its recent addition to its line is especially suited for service station use. It is a machine welding torch with a special tip for metal welding. This specially designed tip is declared to be particularly valuable to repairmen in a variety of welding work.

Other noteworthy features of construction are that it is water cooled, has a valve that allows the torch to be shut off without interfering with the adjustment of the oxygen or acetylene needle valve and is firmly constructed to insure longevity and effective service.



# Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R-1—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acason RB-1 1/2—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acason H-2 1/2—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acason L-3 1/2—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acason M-5—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acse, Series A 1 1/2—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acse, Series A2 1/2—1919-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acme G-3 1/2	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acme B-1—1916-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acme F-1 1/2—1919-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acme A-2—1916-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acme AC-2 1/2—1921	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acme C-3 1/2—1917-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Acme E-5—1919-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
American 25-2 1/2	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
American 40-4	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
American 50-5	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Apex C-1	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Apex D-1 1/2	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Apex E-2 1/2	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Apex G	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Armleder 20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Armleder KW-3 1/2—1916-21	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Armleder HW-2 1/2—1916-21	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atco B-1 1/2	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atco B1-1 1/2	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atco A-2 1/2	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atlas 21-1	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atterbury 20R-1 1/2—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atterbury 7CX-2 1/2—1919-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atterbury 7D-3 1/2—1917-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Atterbury 8E-5—1919-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Autocar XXI-F-2—1915-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Autocar XXI-G-2—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Autocar XXVI-Y-4—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Autocar XXVI-B-4—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H-1 1/2—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H-2 1/2—1916-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H3—1916-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H5—1916-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H7—1919-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H2—1921	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H2 1/2—1921	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H3 1/2—1921	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H5—1921	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Available H7—1921	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Avery 1—1920	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Beck-Hawkeye A-1—1912-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/2	1 1/4	F	11 1/2	3	1 1/4	2	11 1/2	3	1 1/4	2	112	34
Beck-Hawkeye B 1 1/2—1912-20	4	1 1/4	1 1/4	1 1/4	1 1/4	10 1/2	2 1/2	6 1/2	2	37 1/												

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Columbia G-2½—1921.....	3	1 1/4	1 1/4	1 1/4	V	11	1 1/4	10	1 1/4	38	1 1/4	F	55	3	1 1/4	2	50	2	1 1/4	2	132	32 1/2
Commerce T-1500.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	10	1 1/4	44	1 1/4	V	50	2	1 1/4	2	48 1/2	2	1 1/4	2	92 1/2	34
Commerce 12-3000.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	10	1 1/4	44	1 1/4	V	45	2 1/2	1 1/4	2	43	2 1/4	1 1/4	2	99 1/2	34
Commerce 16-4000.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	10	1 1/4	44	1 1/4	V	45	2 1/2	1 1/4	2	43	2 1/4	1 1/4	2	108 1/2	34
Concord A-2—1921.....	4	1 1/4	1 1/4	1 1/4	H	11	2 3/4	9 1/2	1 1/2	34	2	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	108 1/2	32 1/2
Concord A-X-2—1921.....	4	1 1/4	1 1/4	1 1/4	H	11	2 3/4	9 1/2	1 1/2	34	2	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	122 1/2	32 1/2
Concord B-3—1921.....	4	1 1/4	1 1/4	1 1/4	H	11	2 3/4	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1 1/4	4	13 1/2	3 1/2	1 1/4	4	122 1/2	32 1/2
Concord BX-3—1921.....	4	1 1/4	1 1/4	1 1/4	H	11	2 3/4	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1 1/4	4	13 1/2	3 1/2	1 1/4	4	155 1/2	32 1/2
Corbitt E-1—1917-20.....	3	1 1/4	1 1/4	1 1/4	V	8	2	14	2	38	1 1/4	V	19	2	1 1/4	2	19	2	1 1/4	2	105	34
Corbitt D-1½—1916-20.....	3	1 1/4	1 1/4	1 1/4	V	8	2	14	2	38	1 1/4	V	45 1/2	2	1 1/4	1	45 1/2	2	1 1/4	1	120	34
Corbitt C-2—1915-20.....	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/4	1 1/4	1	51 1/2	2 1/4	1 1/4	1	138	35
Corbitt B-2½—1916-20.....	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/4	1 1/4	1	51 1/2	2 1/4	1 1/4	1	138	35
Corbitt AA-5—1919-20.....	3	1 1/4	1 1/4	1 1/4	V	13	1 1/4	8	1 1/4	36	2	V	69 1/2	3	1 1/4	1	69 1/2	3	1 1/4	1	160	38
Corbitt A-3½—1917-20.....	3	1 1/4	1 1/4	1 1/4	V	13	2	14	2	36	1 1/4	V	64	2 1/2	1 1/4	1	64	2 1/2	1 1/4	1	160	35
Cyclone A-3000.....	3	1 1/4	1 1/4	1 1/4	V	16	2	16	2	32 1/2	1 1/4	F	21 1/2	2 1/2	1 1/4	4	19 1/2	2 1/4	1 1/4	4	113	34
Dart H-1—1920-21.....	3	1 1/4	1 1/4	1 1/4	H	11	2	8	1 1/4	36	1	F	19	1 1/4	1 1/4	4	19	1 1/4	1 1/4	4	102	34
Dart S-1½—1920-21.....	3	1 1/4	1 1/4	1 1/4	H	11	2	8	1 1/4	36	1	F	19	1 1/4	1 1/4	4	19	1 1/4	1 1/4	4	112	34
Dart M-2½—1920-21.....	4	1 1/4	1 1/4	1 1/4	H	11	2	14	1 1/4	35	2	F	10	2 1/2	1 1/4	2	19	3 1/2	1 1/4	4	124	34
Dart W-3½—1920-21.....	4	1 1/4	1 1/4	1 1/4	H	11	2	12	1 1/2	36	2	F	28	2 1/4	1 1/4	4	28	2 1/4	1 1/4	4	144	38
Day-Elder A-1.....	3	1 1/4	1 1/4	1 1/4	V	9	2	9 1/2	2	40	1 1/4	V	19	2	1 1/4	2	19	2	1 1/4	2	108	35
Day-Elder B-1½.....	3	1 1/4	1 1/4	1 1/4	V	9	2	9 1/2	2	40	1 1/4	V	19	2	1 1/4	2	19	2	1 1/4	2	120	35
Day-Elder D-2.....	3	1 1/4	1 1/4	1 1/4	V	4	1 1/2	9	1 1/2	35	1 1/2	V	45	2	1 1/4	2	45	2	1 1/4	2	125	35
Day-Elder C-2½.....	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	12	1 1/4	36 1/2	2	F	52	2 1/4	1 1/4	2	52	2 1/4	1 1/4	2	123	35
Day-Elder F-3½.....	3	1 1/4	1 1/4	1 1/4	V	6 1/2	1 1/4	12	1 1/4	35 1/4	1 1/2	F	56 1/2	2 1/2	1 1/4	2	56 1/2	2 1/2	1 1/4	2	148	35
Day-Elder E-5.....	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2	10	1 1/4	38 1/2	1 1/2	F	69	3	1 1/4	2	69	3	1 1/4	2	155	37
Dearborn BW-2—1915-17-19-20.....	3	1 1/4	1 1/4	1 1/4	V	8 1/2	2	6	1 1/4	37	1	F	18	2 1/2	1 1/4	2	18	1 1/2	1 1/4	2	130	32
Dearborn F-1½—1915-17-19-20.....	3	1 1/4	1 1/4	1 1/4	V	12	2	8	1 1/4	37	1	F	16 1/2	2 1/2	1 1/4	2	16 1/2	1 1/2	1 1/4	2	96 1/2	34
Dearborn C-1—1915-17-19-20.....	3	1 1/4	1 1/4	1 1/4	V	12	2	8	1 1/4	37	1	F	16 1/2	2 1/2	1 1/4	2	16 1/2	1 1/2	1 1/4	2	107	32
Defiance B-1½—1918-19-20.....	3	1 1/4	1 1/4	1 1/4	V	10	2	8	2	40 1/4	1 1/4	F	45	2 1/2	1 1/4	1	43	2 1/4	1 1/4	1	116	34
Defiance C-2—1918-19-20.....	3	1 1/4	1 1/4	1 1/4	V	10	2	8	2	40 1/4	1 1/4	F	54 1/2	2 1/2	1 1/4	1	52 1/2	2 1/4	1 1/4	1	116	34
Defiance D—1920-21.....	3	1 1/4	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 1/4	1 1/4	F	45	2 1/2	1 1/4	1	43	2 1/4	1 1/4	1	120	34
Defiance E—1920-21.....	3	1 1/4	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 1/4	1 1/4	F	54 1/2	2 1/2	1 1/4	1	52 1/2	2 1/4	1 1/4	1	120	34
Denby 31-1½—1921.....	3	1 1/4	1 1/4	1 1/4	V	6	2 1/2	19	2 1/2	38 1/2	1 1/4	F	49	2 1/2	1 1/4	2	47 1/2	2 1/4	1 1/4	2	97 1/2	34
Denby 33-1½—1921.....	3	1 1/4	1 1/4	1 1/4	V	12	2	9	2	42	1 1/4	V	8 1/2	4	1 1/4	2	46 1/2	1 1/2	1 1/4	2	120	34
Denby 134-2—1921.....	3	1 1/4	1 1/4	1 1/4	V	12	2	9	2	42	1 1/4	V	53 1/2	3	1 1/4	2	50 1/2	2	1 1/4	2	127	34
Denby 25-3—1921.....	3	1 1/4	1 1/4	1 1/4	V	12	2	9	2	35	1 1/4	F	56 1/2	3	1 1/4	2	47 1/2	2	1 1/4	2	127	34
Denby 27-4—1921.....	3	1 1/4	1 1/4	1 1/4	V	13	1 1/4	16 1/4	1 1/4	39 1/4	1 1/2	F	8 1/2	4	1 1/4	2	58	2 1/4	1 1/4	2	140	34
Denby 210-5—1921.....	3	1 1/4	1 1/4	1 1/4	V	13	1 1/4	16 1/4	1 1/4	39 1/4	1 1/2	F	8 1/2	4	1 1/4	2	58	2 1/4	1 1/4	2	140	34
Dependable Dispatch A-1 1921.....	4	1 1/4	1 1/4	1 1/4	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/2	2 1/4	1 1/4	1	38 1/2	2 1/4	1 1/4	1	108	33 1/2
Dependable C-1½—1920-21.....	4	1 1/4	1 1/4	1 1/4	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/2	2 1/4	1 1/4	1	38 1/2	2 1/4	1 1/4	1	121	33
Dependable D-2 1920-21.....	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	53 1/2	2 1/4	1 1/4	1	38 1/2	2 1/4	1 1/4	1	140	33
Dependable E-2½—1920-21.....	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	63	2 1/2	1 1/4	1	49	2 1/2	1 1/4	1	152	33
Dependable G-3½ 1921.....	4	1 1/4	1 1/4	1 1/4	V	13	2	13	1 1/4	37 1/2	2	F	63	2 1/2	1 1/4	1	49	2 1/2	1 1/4	1	170	33
Diamond T-O-3-1.....	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	48	2 1/2	1 1/4	2	33	2 1/2	1 1/4	2	100	34
Diamond T-FS&T-1½.....	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	11 1/2	3 1/4	1 1/4	4	11 1/2	3 1/4	1 1/4	4	Opt	34
Diamond T-U-2.....	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	13 1/2	3 1/2	1 1/4	4	13 1/2	3 1/2	1 1/4	4	Opt	34
Diamond TK-3½.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	10	1 1/4	35	2	F	15 1/2	3 1/4	1 1/4	4	15 1/2	3 1/4	1 1/4	4	Opt	37
Diamond T-EL-5.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	10	1 1/4	35	2	F	18	4	1 1/4	4	17 1/2	4	1 1/4	4	Opt	37
Diamond T-S-5.....	3	1 1/4	1 1/4	1 1/4	V	9	2	21	2	40 1/2	2	F	18	4	1 1/4	4	17 1/2	4				



## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
G.M.C. K-41	4	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	13	3 1/2	1 1/4	4	13	3 1/2	1 1/4	4	Opt	33
G.M.C. K-71	4	1 1/4	1 1/4	1 1/4	V	11 1/4	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	15 1/4	3 3/4	1 1/4	4	15 1/4	3 3/4	1 1/4	4	Opt	38
G.M.C. K-101	4	1 1/4	1 1/4	1 1/4	V	11 1/4	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	17 1/4	4	1 1/4	4	17 1/4	4	1 1/4	4	Opt	38
Gove A-1-2 1/2	3	1 1/4	1 1/4	1 1/4	V	5	1 1/4	4	1 1/4	64	1 1/4	F	54 1/4	2 1/2	1 1/4	2	24 1/4	2 1/2	1 1/4	2	119 1/2	34
Graham A	3	1 1/4	1 1/4	1 1/4	V	5	1 1/4	4	1 1/4	64	1 1/4	F	21	2 1/2	1 1/4	2	21	2 1/2	1 1/4	2	140 3/4	33
Gramm-Bernstein 10 Speed—1921	3	1 1/4	1 1/4	1 1/4	V	5	1 1/4	4	1 1/4	64	1 1/4	F	21	2 1/2	1 1/4	2	21	2 1/2	1 1/4	2	97	30
Gramm-Bernstein 15-1 1/2—1921	3	1 1/4	1 1/4	1 1/4	H	10 1/4	2	6	2	39	1 1/4	F	48 1/2	2	1 1/4	2	45 1/2	1 1/4	1 1/4	2	120	32
Gramm-Bernstein 65-1 1/2—1921	3	1 1/4	1 1/4	1 1/4	H	10 1/4	2	6	2	39	1 1/4	F	19 1/4	1 1/4	1 1/4	4	19 1/4	1 1/4	1 1/4	4	120	32
Gramm-Bernstein 20-2—1921	3	1 1/4	1 1/4	1 1/4	V	4 1/2	1 1/4	12	1 1/4	32	2	F	45	2	1 1/4	4	45	2	1 1/4	4	126	32 1/2
Gramm-Bernstein 25-2 1/2—1921	3	1 1/4	1 1/4	1 1/4	V	11	1 1/4	9	1 1/2	33 1/4	2	F	22 1/4	2 1/4	1 1/4	4	22 1/4	2 1/4	1 1/4	4	129 1/4	36
Gramm-Bernstein 30—1921	3	1 1/4	1 1/4	1 1/4	V	11	1 1/4	9	1 1/2	33 1/4	2	F	22 1/4	2 1/4	1 1/4	4	22 1/4	2 1/4	1 1/4	4	129 1/4	36
Gramm-Bernstein 35-3 1/2—1921	3	1 1/4	1 1/4	1 1/4	V	11	1 1/4	9	1 1/2	33 1/4	2	F	28 1/4	2 1/4	1 1/4	4	28 1/4	2 1/4	1 1/4	4	144	36
Gramm-Bernstein 50-5—1921	3	1 1/4	1 1/4	1 1/4	V	23 1/4	2	13 1/4	1 1/4	40 1/4	2	F	32 1/4	2 1/4	1 1/4	4	32 1/4	2 1/4	1 1/4	4	162	36
G. W. W.	3	1 1/4	1 1/4	1 1/4	V	12	1 1/4	11	1 1/4	37	2	F	49	2 1/2	1 1/4	2	47	1 1/2	1 1/4	2	89	32
Hall 2-Worm-2 1/2	3	1 1/4	1 1/4	1 1/4	V	8	1 1/4	12 1/2	1 1/4	32	1 1/4	F	11 1/2	3	1 1/4	4	11 1/2	3	1 1/4	4	144	38
Hall 3 1/2-Worm	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/4	1 1/4	F	15	3 1/4	1 1/4	4	15	3 1/4	1 1/4	4	180	39
Hall 5-Worm	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/4	1 1/4	F	18	4	1 1/4	4	18	4	1 1/4	4	144	39
Hall 7-Chain	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/4	1 1/4	F	18	4	1 1/4	4	18	4	1 1/4	4	144	39
Hendrickson 1-2 1/2	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/4	1 1/4	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	Opt	32 1/2
Hendrickson J-3 1/2	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/4	1 1/4	F	16	3 3/4	1 1/4	4	16	3 3/4	1 1/4	4	Opt	36
Hendrickson K-5	3	1 1/4	1 1/4	1 1/4	V	14	2 3/4	10	2 3/4	53	1 1/4	V	18	4	1 1/4	4	18	4	1 1/4	4	Opt	38
Highway Knight A	3	1 1/4	1 1/4	1 1/4	V	14	2 3/4	10	2 3/4	53	1 1/4	V	57	2 1/2	1 1/4	2	57	2 1/2	1 1/4	2	147	38
Highway Knight B-5	3	1 1/4	1 1/4	1 1/4	V	14	2 3/4	10	2 3/4	53	1 1/4	V	69	3	1 1/4	2	69	3	1 1/4	2	147	38
Higrade A18-1—1918-19	3	1 1/4	1 1/4	1 1/4	V	9	2	7	2	32	1 1/2	R	12	1 1/2	1 1/4	2	12	1 1/2	1 1/4	2	85	32
Higrade B20-1 1/2—1919-20	3	1 1/4	1 1/4	1 1/4	V	9	2	7	2	32	1 1/2	R	18	2	1 1/4	2	18	2	1 1/4	2	100	32
Holmes 4WD-2	3	1 1/4	1 1/4	1 1/4	V	24	2	14 1/2	2	54	2	F	24	2	1 1/4	2	46	3	1 1/4	2	120	30
Huffman B-1 1/2—1919-20	3	1 1/4	1 1/4	1 1/4	V	44	2 1/4	24	2 1/4	114	2 1/4	F	44	2 1/4	1 1/4	2	44	2 1/4	1 1/4	2	123	32
Huffman C-1 1/2—1919-20	3	1 1/4	1 1/4	1 1/4	V	46	2 1/4	24	2 1/4	114	2 1/4	F	46	2 1/4	1 1/4	2	44	2 1/4	1 1/4	2	123	32
Hurlburt A1 1/2-2	3	1 1/4	1 1/4	1 1/4	V	22	2	12	2	44	2	F	22	2	1 1/4	2	22	2	1 1/4	2	132	35 1/2
Hurlburt B2 1/2	3	1 1/4	1 1/4	1 1/4	V	24	2 1/4	14	2 1/4	54	2 1/4	F	24	2 1/4	1 1/4	2	23	2 1/4	1 1/4	2	154	34
Hurlburt C3 1/2-4	3	1 1/4	1 1/4	1 1/4	V	26	3	16	3	60	3	F	26	3	1 1/4	2	25	3	1 1/4	2	144 1/2	34
Hurlburt D5-5 1/2	3	1 1/4	1 1/4	1 1/4	V	28	3 1/4	18	3 1/4	66	3 1/4	F	28	3 1/4	1 1/4	2	27	3 1/4	1 1/4	2	144 1/2	34
Huron-Erie 1 1/2	4	1 1/4	1 1/4	1 1/4	V	15	3	10	3	40	3	F	15	3	1 1/4	2	50	2	1 1/4	2	121	33
Huron-Michigan 2 1/2	4	1 1/4	1 1/4	1 1/4	V	15	3	10	3	40	3	F	15	3	1 1/4	2	50	2 1/2	1 1/4	2	145	33
Indiana 12-1 1/2—1921	3	1 1/4	1 1/4	1 1/4	V	17	1 1/4	14	1 1/4	38 1/2	1 1/4	F	17 1/2	2	1 1/4	4	17 1/2	2	1 1/4	4	108	32
Indiana 20-2—1921	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/4	1 1/4	F	44	2	1 1/4	2	44	2	1 1/4	2	126	33
Indiana 25-2 1/2—1921	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/4	1 1/4	F	51	2 1/4	1 1/4	2	51	2 1/4	1 1/4	2	138	33
Indiana 35-3 1/2—1921	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/4	1 1/4	F	56	2 1/4	1 1/4	2	56	2 1/4	1 1/4	2	144	34 1/2
Indiana 51-5—1921	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	17 1/2	1 1/4	30 1/4	1 1/4	F	68	3	1 1/4	2	68	3	1 1/4	2	156	37 1/2
International S-1500 lbs.—Speed Truck '21	3	1 1/4	1 1/4	1 1/4	V	9 1/4	1 1/4	17 1/2	1 1/4	30 1/4	1 1/4	F	38	2	1 1/4	2	36	2	1 1/4	2	90	34
International 21-2000 lbs.—1916-21	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/4	1 1/4	F	43 1/4	2 1/4	1 1/4	2	43 1/4	2 1/4	1 1/4	2	75 1/2	34
International 31-3000 lbs.—1916-21	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/4	1 1/4	F	43 1/4	2 1/4	1 1/4	2	43 1/4	2 1/4	1 1/4	2	88 1/2	34
International 41-4000 lbs.—1918-21	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/4	1 1/4	F	50 1/4	2 1/4	1 1/4	2	50 1/4	2 1/4	1 1/4	2	91 1/2	34
International 61-6000 lbs.—1918-21	4	1 1/4	1 1/4	1 1/4	V	9	2 1/4	14 1/2	2	38 1/4	1 1/4	F	50 1/4	2 1/4	1 1/4	2	50 1/4	2 1/4	1 1/4	2	118 1/2	34
International 101-10,000 lbs.—1920-21	4	1 1/4	1 1/4	1 1/4	V	9	2 1/4	14 1/2	2	38 1/4	1 1/4	F	73 1/4	2 1/4	1 1/4	2	73 1/4	2 1/4	1 1/4	2	147 1/2	34
Jackson B 3 1/2	3	1 1/4	1 1/4	1 1/4	V	11	1 1/4	9	1 1/4	32 1/4	1 1/4	F	58 1/4	2 1/4	1 1/4	2	58 1/4	2 1/4	1 1/4	2	150	36
Jumbo 15-1 1/2—1919	4	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	18	1 1/4	33 1/4	2	F	48 1/2	2	1 1/4	2	47	1 1/2	1 1/4	2	120	32
Jumbo 20-2—1919	4	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	18	1 1/4	33 1/4	2	F	48 1/2	2	1 1/4	2	47	1 1/2	1 1/4	2	120	32
Jumbo 25-2 1/2—1917-19	3	1 1/4	1 1/4																			

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME		
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
MacDonald A-7 1/2	4	1 1/2	1 1/2	1 1/2	V	12	2	21	1 1/2	35	2	F	70	3	1 1/2	1	34	3	1 1/2	1	Opt	33 1/2
Mack AB 1 1/2, 2, 2 1/2-Ton-Chain '16-20	4	1 1/2	1 1/2	1 1/2	...	9 1/2	1 1/2	4 1/2	1 1/2	33	1 1/2	F	12 1/2	4	1 1/2	2	16 1/2	2 1/2	1 1/2	4	Opt	33 1/2
Mack Dual Reduction, 1 1/2, 2 1/2-1921	4	1 1/2	1 1/2	1 1/2	...	9 1/2	1 1/2	4 1/2	1 1/2	33	1 1/2	F	12 1/2	4	1 1/2	2	16 1/2	2 1/2	1 1/2	4	Opt	33 1/2
Mack AB-Tractor 5 Ton-16-20	4	1 1/2	1 1/2	1 1/2	...	5 1/2	2 1/2	4 1/2	1 1/2	...	1	V	16 1/2	3	1 1/2	4	20 1/2	3 1/2	1 1/2	4	Opt	37 1/2
Mack AC 3 1/2 to 7 1/2 ton-16-20	4	1 1/2	1 1/2	1 1/2	...	5 1/2	2 1/2	4 1/2	1 1/2	...	1	V	16 1/2	3	1 1/2	4	20 1/2	3 1/2	1 1/2	4	Opt	37 1/2
Mack AC Trac. 7 to 15 Ton-16-20	4	1 1/2	1 1/2	1 1/2	...	5 1/2	2 1/2	4 1/2	1 1/2	...	1	V	16 1/2	3	1 1/2	4	20 1/2	3 1/2	1 1/2	4	Opt	37 1/2
Master JI-1 1/2-1919-20	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	30 1/2	1	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master JW-1 1/2-1919-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	30 1/2	1	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master M-2 1/2-1916-20	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	33	1 1/2	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master O 2 1/2-1917-20	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	33	1 1/2	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master W-2 1/2-1916-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master WL 2 1/2-1917-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master D-2 1/2-1920-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master DL-2 1/2-1920-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master T-6 Tractor-1917-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	33	1 1/2	F	74 1/2	2 1/2	1 1/2	1	74 1/2	2 1/2	1 1/2	1	117 1/2	34 1/2
Master A-3 1/2-1918-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	16	3 1/2	1 1/2	2	16	3 1/2	1 1/2	2	147 1/2	36 1/2
Master AL-3 1/2-1918-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	16	3 1/2	1 1/2	2	16	3 1/2	1 1/2	2	147 1/2	36 1/2
Master E-3 1/2-1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	11	6	1 1/2	2	25	4	1 1/2	4	147 1/2	36 1/2
Master EL-3 1/2-1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	11	6	1 1/2	2	25	4	1 1/2	4	147 1/2	36 1/2
Master B-5-1919-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1 1/2	2	18	4	1 1/2	2	162 1/2	39
Master BL-5-1919-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1 1/2	2	18	4	1 1/2	2	162 1/2	39
Master F-5-1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1 1/2	2	25	4	1 1/2	4	162 1/2	39
Master FL-5-1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1 1/2	2	25	4	1 1/2	4	162 1/2	39
Maxwell 1 1/2-1917-20	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	16	1 1/2	1 1/2	4	16	1 1/2	1 1/2	4	102	36
Menominee HT-1-1918-20	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	12	3 1/2	1 1/2	8	...	...	...	...	104	32
Menominee H-1 1/2-1916-20	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	13 1/2	3 1/2	1 1/2	8	...	...	...	...	122	32
Menominee D-2-1915-20	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	13 1/2	3 1/2	1 1/2	8	...	...	...	...	146	32
Menominee G-3 1/2-1916-20	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	16	3 1/2	1 1/2	8	...	...	...	...	149	36
Menominee J-5-1917-20	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	18 1/2	4	1 1/2	8	...	...	...	...	149	38
Menominee Ht-1-1920-late	3	1 1/2	1 1/2	1 1/2	...	9 1/2	1 1/2	10 1/2	1 1/2	33 1/2	1 1/2	F	47 1/2	2 1/2	1 1/2	2	33 1/2	2 1/2	1 1/2	2	102 1/2	32
Menominee H-1-1920-late	3	1 1/2	1 1/2	1 1/2	...	9 1/2	1 1/2	10 1/2	1 1/2	33 1/2	1 1/2	F	47 1/2	2 1/2	1 1/2	2	33 1/2	2 1/2	1 1/2	2	124	32
Menominee D-2-1920-late	3	1 1/2	1 1/2	1 1/2	...	3	1 1/2	3	1 1/2	37 1/2	2	F	57 1/2	2 1/2	1 1/2	2	42 1/2	2 1/2	1 1/2	2	131 1/2	32
Menominee G-3 1/2-1920-late	3	1 1/2	1 1/2	1 1/2	...	3	1 1/2	3	1 1/2	37 1/2	2	F	57 1/2	2 1/2	1 1/2	2	42 1/2	2 1/2	1 1/2	2	149	36
Menominee J-5-1920-late	3	1 1/2	1 1/2	1 1/2	...	3	1 1/2	3	1 1/2	40 1/2	2	F	69 1/2	3 1/2	1 1/2	2	52	2 1/2	1 1/2	2	149	38
Moline	3	1 1/2	1 1/2	1 1/2	H	10 1/2	2 1/2	4 1/2	1 1/2	24 1/2	2	F	21	2 1/2	1 1/2	2	20	2	1 1/2	2	108	32
Moreland 21B-1 1/2-1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	1 1/2	13	1 1/2	42	1 1/2	F	12	3 1/2	1 1/2	4	12	3 1/2	1 1/2	4	132	34
Moreland 21C-2 1/2-1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	1 1/2	13	1 1/2	42	1 1/2	F	13 1/2	3 1/2	1 1/2	4	13 1/2	3 1/2	1 1/2	4	156	34
Moreland 21H-4-1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	2	19	2	42	2	F	16	3 1/2	1 1/2	4	16	3 1/2	1 1/2	4	168	38
Moreland 21J-5-1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	2	19	2	42	2	F	18	4	1 1/2	4	18	4	1 1/2	4	168	38
Mutual 2B-1919-20	3	1 1/2	1 1/2	1 1/2	V	19	1 1/2	17	1 1/2	37 1/2	2	F	51	2 1/2	1 1/2	2	51	2 1/2	1 1/2	2	128 1/2	34
Mutual 2BP-1919-20	3	1 1/2	1 1/2	1 1/2	V	19	1 1/2	17	1 1/2	37 1/2	2	F	51	2 1/2	1 1/2	2	51	2 1/2	1 1/2	2	128 1/2	34
Napoleon 9-1-1919-20	3	1 1/2	1 1/2	1 1/2	V	6	2 1/2	12	2	36	1	F	44	2	1 1/2	1	30	2 1/2	1 1/2	1	101	35 1/2
Napoleon 11-1 1/2-1919-20	3	1 1/2	1 1/2	1 1/2	V	6	2 1/2	12	2	36	1	F	49	2	1 1/2	1	30	2 1/2	1 1/2	1	101	35 1/2
Nash 2018-1-1919-20	4	1 1/2	1 1/2	1 1/2	V	3	1 1/2	7 1/2	1 1/2	36	1	F	49 1/2	2	1 1/2	2	20	2 1/2	1 1/2	1	104 1/2	30 1/2
Nash 3018-2-1919-20	4	1 1/2	1 1/2	1 1/2	V	3	1 1/2	7 1/2	1 1/2	44	1	F	50 1/2	3	1 1/2	2	20	2 1/2	1 1/2	1	118 1/2	31 1/2
Nash 4017-2-1919-20	3	1 1/2	1 1/2	1 1/2	V	7	1 1/2	...	...	44	2	F	49 1/2	2 1/2	1 1/2	4	25 1/2	3 1/2	1 1/2	1	117 1/2	38 1/2
Nelson & LeMoon F1	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	12	3 1/2	1 1/2	2	12	3 1/2	1 1/2	2	Opt	...
Nelson & LeMoon F1 1/2	3	1 1/2	1 1/2	1 1/2	...	...	...	...	...	...	...	...	12	3 1/2	1 1/2	2	12	3 1/2	1 1/2	2	Opt	...
</																						



## Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME		
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Rainier R6-1½	3	1	1	1	V	9½	1½	14½	1½	41	1½	F	19	2	1	2	19	2	1	2	113	34
Rainier R-19-1	3	1	1	1	V	8½	1½	14	1½	41	1½	F	19	2	1	2	19	2	1	2	100	34
Rainier R11-¾	3	1	1	1	V	9	1½	14½	1½	42	1½	F	19	2	1	2	19	2	1	2	90	34
Ranger TK-20-2	3	1	1	1	H	11½	1	10	1½	33½	1	F	11½	3½	1	2	11½	3½	1	2	106½	33
Reliance 10A-1½-1920-21	4	1	1	1	V	10½	2	13½	1½	35	2	F	17	2	1	4	17	2	1	4	122	32
Reliance 20B-2½-1920-21	4	1	1	1	V	10½	2	13½	1½	35	2	F	17	2	1	4	17	2	1	4	127	32
Reo F-1500-2500-lbs	3	1	1	1	V	5½	1	5½	1	39	¾	F	43	2½	1	1	39½	2½	1	1	82	30
Republic 10-1-10E-1-1919-20-21	3	1	1	1	V	12½	2	6	2	40	1½	F	21½	2½	1	4	19½	2½	1	4	118	34
Republic 11X-1½-1919-20-21	3	1	1	1	V	12½	2	6	2	40	1½	F	21½	2½	1	4	19½	2½	1	4	121	34
Republic 19-2½-1919-20-21	3	1	1	1	V	8	1½	11½	1½	32	1½	F	25½	3½	1	2	24½	3½	1	2	146	37
Republic 20-3½-1919-20-21	3	1	1	1	V	7½	1½	5½	1½	36	1½	F	55½	3½	1	2	30½	4½	1	2	95	31
Republic 75-¾-1921	3	1	1	1	V	12	2½	18½	2½	31	1	F	19	2	1	4	18	2	1	4	121	33
Reynolds 3A-1½	3	1	1	1	V	9½	1½	8	1½	49½	1½	V	46	2	1	2	46	2	1	2	126	33
Reynolds 5A-2½	3	1	1	1	V	9½	1½	8	1½	49½	1½	V	52½	2½	1	2	52½	2½	1	2	148	37
Reynolds 7A-3½	3	1	1	1	V	9½	1½	8	1½	49½	1½	V	57	2½	1	2	57	2½	1	2	148	37
Reynolds 10A-5	3	1	1	1	V	9½	1½	8	1½	49½	1½	V	70	3	1	2	70	3	1	2	150	38
Riker B3, BB-4	5	1	1	1	V	9½	1½	8	1½	49½	1½	V	7½	4½	1	2	20	4	1	2	113	33
Rowe CW-1½-1918-19-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	19	2	1	8	19	2	1	8	123	33
Rowe CDW2-1916-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	45	2	1	4	45	2	1	4	140	33
Rowe GSW3-1918-20	3	1	1	1	V	20	1½	15½	1½	36½	2	F	51½	2½	1	4	51½	2½	1	4	146	36
Rowe HW4-1918-20	3	1	1	1	V	20	1½	15½	1½	36½	2	F	56½	2½	1	4	56½	2½	1	4	153	38½
Rowe FW5-1914-20	3	1	1	1	V	20	1½	15½	1½	36½	2	F	68	3	1	4	68	3	1	4	152	38
Rowe GPW3-1916-17, 1919-20	3	1	1	1	V	10	1½	6	1½	37	2	F	18	2	1	4	18	2	1	4	122	34
Rumely A-1½	4	1	1	1	V	10½	1½	10½	1½	37	2	F	34½	1½	1	1	37	1½	1	1	108½	39½
Samson 15-¾	3	1	1	1	V	6½	1½	7½	1½	37	1½	V	43½	2	1	1	37	2	1	1	96	34
Samson 25-1½	3	1	1	1	V	6½	1½	7½	1½	37	1½	V	20	2	1	2	20	2	1	2	120	34
Sandow G-1-1918-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	60	3	1	1	60	3	1	1	132	32
Sandow CG-1½-1918-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	13½	3½	1	2	16	3½	1	2	144	32
Sandow I-2-1918-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	24	4½	1	2	24	4½	1	2	144	37
Sandow J-2½-1918-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	18½	4	1	2	18½	4	1	2	144	37
Sandow L-5-1918-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	51½	2½	1	2	51½	2½	1	2	145	35
Sandow M-3½-1918-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	56	2½	1	2	56	2½	1	2	145	35
Sanford 25-2½-1917-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	69	3	1	2	69	3	1	2	140	35½
Sanford W35-2½-1917-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	8½	3½	1	4	13½	3	1	4	140	35½
Sanford W50-5-1917-20	3	1	1	1	V	10½	1½	10½	1½	32½	1½	F	8½	3½	1	4	13½	3	1	4	152	35½
Schacht 2	3	1	1	1	V	9½	1½	13	2½	29½	1½	F	19½	1½	1	4	19½	1½	1	4	120	Opt
Schacht 2½	3	1	1	1	V	10	1½	18	1½	33½	2	F	19	2	1	4	19	2	1	4	120	34
Schacht 3½	4	1	1	1	V	10½	2	15	1½	33½	2	F	48	2½	1	2	48	2½	1	2	134	34
Schacht 5	4	1	1	1	V	12½	2	17	1½	38½	2	F	69½	3	1	2	69½	3	1	2	153	37½
Schwartz A-1½-1921	4	1	1	1	V	9½	1½	13	2½	29½	1½	F	19½	1½	1	4	19½	1½	1	4	120	Opt
Schwartz BW-1½	4	1	1	1	V	10	1½	18	1½	33½	2	F	19	2	1	4	19	2	1	4	120	34
Schwartz CWS-CW-CWL-2½	4	1	1	1	V	10½	2	15	1½	33½	2	F	48	2½	1	2	48	2½	1	2	134	34
Schwartz DWS-DW-DWL-5	4	1	1	1	V	12½	2	17	1½	38½	2	F	69½	3	1	2	69½	3	1	2	153	37½
Selden 1½A-1919-20	3	1	1	1	V	12	1½	12	1½	41	1½	F	11	3½	1	2	11	3½	1	2	114	34
Selden 2½A-1920	3	1	1	1	V	9	1½	5½	1½	34½	2	F	12	3½	1	2	12	3½	1	2	109½	34
Selden 3½A-1919-20	3	1	1	1	V	7	1½	20½	1½	40½	2	F	12	3½	1	2	12	3½	1	2	121	34
Selden 5A-1920	3	1	1	1	V	10	1½	2	1½	35	2	F	12	3½	1	2	12	3½	1	2	131	34
Service 15-1921-¾	3	1	1	1	V	10	1½	2	1½	35	2	F	16	3½	1	2	16	3½	1	2	150	38
Service 220-1-1919-20	3	1	1	1	V	10	1½	2	1½	35	2	F	16	3½	1	2	16	3½	1	2	145½	38
Service 31-1½-1919-20	4	1	1	1	V	10	2	8	1½	33	1½	F	11	3	1	2	11	3	1	2	120	34
Service 36-1½-1919-20	4	1	1	1	V	10	2	8	1½	33	1½	F	12	3½	1	2	12	3½	1	2	126	34
Service 51-2½-1919-20	4	1	1	1	V	10	2	8	1½	33	1½	F	13½	3½	1	2	13½	3½	1	2	168	38
Service 71-3½-1919-20	4	1	1	1	V	10	2	8	1½	33	1½	F	16	3½	1	2	16	3½	1	2	172	38
Service 76-3½-1919-20	4	1	1	1	V	10	2	10	1½	38½	1½	F	18½	4	1	2	18½	4	1	2	120	34
Service 101-5-1919-20	4	1	1	1	V	10	2	10	1½	38½	1½	F	11	3	1	2	11	3	1	2	126	34
Signal NF-1	4	1	1	1	V	10	2	10	1½	38½	1½	F	12	3½	1	2	12	3½	1	2	168	38
Signal H 1½	3	1	1	1	V	10	2	10	1½	38½	1½	F	13½	3½	1	2	13½	3½	1	2	172	38
Signal J-2½	3	1	1	1	V	10	2	10	1½	38½	1½	F	16	3½	1	2	16	3½	1	2	120	34
Signal M 3½	3	1	1	1	V	10	2	10	1½	38½	1½	F	18	4	1	2	18	4	1	2	122	32
Signal R-5	3	1	1	1	V	10½	2	14½	1½	41	1½	F	10½	3	1	4	10½	3	1	4	144	38
Standard I-K-1-1½	3	1	1	1	V	10½	2	14½	1½	41	1½	F	13	3½	1	4	13	3½	1	4	144	38
Standard 78-2½-3	3	1	1	1	V	12	1½	18	1½	42												

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Transport 50-2½	3	1½	1½	1½	V	9¼	2	10	1½	32½	2	F	10¼	3¼	¼	4	48½	2½	¼	2	123	34
Transport 70-3½	4	1½	1½	1½	V	12¼	2	16	1½	35½	2	F	11½	3½	¼	4	58	2½	¼	2	150	36½
Traylor B-1½	4	1½	1½	1½	V	12¼	2	16	1½	35½	2	F	11½	3½	¼	4	58	2½	¼	2	117	34
Traylor C-2	4	1½	1½	1½	V	12¼	2	16	1½	36	2	F	50	50	¼	2	50	2½	¼	2	122	34
Traylor D-3	4	1½	1½	1½	V	12¼	2	16	1½	36	2	F	56½	56½	¼	2	56½	2½	¼	2	142	34
Traylor E-4	4	1½	1½	1½	V	12¼	2	16	1½	37	2	F	59	59	¼	2	59	2½	¼	2	165	35
Traylor F-5	4	1½	1½	1½	V	12¼	2	16	1½	37	2	F	59	59	¼	2	59	2½	¼	2	165	35
Triangle AA-¾—1920	3	1	1	1	H	17	3	17	3	34	1	F	22	7	¼	1	41	2	¼	2	94	35
Triangle A-1½—1918-20	3	1	1	1	V	14	1½	14½	1½	39½	1½	F	7	4	¼	1	49	2	¼	2	126	34
Triangle B-2½—1919-20	3	1	1½	1½	V	18	1½	18	1½	39½	1½	F	7	4	¼	1	52	2	¼	2	132	34
Triangle C-2—1920	3	1	1	1	V	14	1½	14½	1½	39½	1½	F	7	4	¼	1	52	2	¼	2	129	34
Triumph HB-2½	4	1½	1½	1½	V	9	1½	9	1½	32½	2	F	46	2½	¼	1	32	2½	¼	2	120	34½
Triumph HC-2	4	1½	1½	1½	V	9	1½	9	1½	32½	2	F	46	2½	¼	1	32	2½	¼	2	120	34½
Twin City 2	3	1½	2	2	V	11	1½	13	1½	36½	2	F	50	3	¼	1	48	2½	¼	2	132	33
Twin City 3½	4	1½	2	2	V	11	1½	13	1½	36½	2	F	15	3½	¼	1	15	2½	¼	2	156	36
Ultimate A-2—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	45	2	¼	1	45	2	¼	2	126	32½
Ultimate AJ2—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	45	2	¼	1	45	2	¼	2	126	32½
Ultimate AJL-2-1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	45	2	¼	1	45	2	¼	2	150	32½
Ultimate B-3—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	51	2	¼	1	51	2½	¼	2	144	32½
Ultimate BL3—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	51	2	¼	1	51	2½	¼	2	192	32½
Union F-2½	3	1½	1½	1½	V	20	1½	19½	1½	37½	2	F	55	3	¼	1	50	2	¼	1	133½	32
Union FW-2½	3	1½	1½	1½	V	20	1½	19½	1½	37½	2	F	26	4½	¼	1	52	3	¼	1	133½	32
Union H-4	3	1½	1½	1½	V	20	1½	19½	1½	37½	2	F	56½	3½	¼	1	32	4½	¼	1	157½	34
Union HW-4	3	1½	1½	1½	V	20	1½	19½	1½	37½	2	F	26	4½	¼	1	24	4	¼	2	157½	34
Union JW-6	3	1½	2	2	V	20	1½	19½	1½	41½	2	F	34	4	¼	1	28	5	¼	2	190	36
United 1½	1	1½	1	1	V	15	2½	16	1½	37½	2	F	48	2	¼	1	48	1½	¼	1	120	33
United-2½	1	1½	1	1	V	7	2½	7	1½	37½	2	F	49	3	¼	1	49	2½	¼	1	Opt	33
United 3½	1	1½	1	1	V	7	2½	7	1½	37½	2	F	62	3	¼	1	58	2½	¼	1	Opt	34
United 5	1	1½	1	1	V	14½	2	12	1½	37½	2	F	88½	2½	¼	1	88½	2½	¼	1	Opt	39
U.S.N.-1½	3	1½	1	1	H	11½	2	9	1½	37	1½	F	50	2½	¼	1	46½	1½	¼	2	120	34
U.S.R.-2½-3	3	1½	1	1	V	10	1½	9	1½	35	1½	F	46	2½	¼	1	46	2½	¼	2	144	34
U.S.S.-3½-4	3	1½	1	1	V	9	1½	8	1½	37	1½	F	50	2½	¼	1	50	2½	¼	2	156	36
U.S.T.-5-6	3	1½	1	1	V	15	2	13	1½	38½	2	F	62	3	¼	1	33	4	¼	2	168	36
Velie 46-1½—1921	3	1½	1	1	V	9½	2½	12½	1½	40	2	F	54	2½	¼	1	52½	2½	¼	2	120	31
Vim 29-½	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	14½	1½	¼	1	14½	1½	¼	1	64	30
Vim 30-½	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	14½	1½	¼	1	14½	1½	¼	1	83½	30
Vim 31-1	4	1½	1	1	V	14½	1½	14	1½	30½	1½	F	18	2	¼	1	18	2	¼	1	92	32
Vim 22-2	4	1½	1	1	V	14½	1½	14	1½	30½	1½	F	42½	2	¼	1	42½	2	¼	1	120½	34
Vim 23-3	5	1½	1	1	V	14½	1½	14	1½	30½	1½	F	48½	2½	¼	1	48½	2½	¼	1	160	34
Walker M½	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	43	2½	¼	1	14	1½	¼	1	90	32
Walker K1	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	45½	2½	¼	1	16	2	¼	1	96	32
Walker L2	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	53½	2½	¼	1	19	2	¼	1	120	32
Walker P3½	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	53½	2½	¼	1	19½	2½	¼	1	140	35
Walker N5	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	53½	2½	¼	1	19½	2½	¼	1	162	35
Walker-Johnson B2½	4	1½	1½	1½	V	10	1½	18	1½	39	1½	F	13	3½	¼	1	13	3½	¼	1	133	32½
Walter S-5	3	1½	2	2	V	7	1½	16	1½	39	1½	F	15	5	¼	1	57	2	¼	1	150	36
Ward LaFrance 2B-2½-3—1920	3	1½	1½	1½	V	8½	1½	18	1½	41½	1½	F	13	3½	¼	1	13	3½	¼	1	137½	33
Ward LaFrance 4A-3½-4—1920	3	1½	1½	1½	V	8½	1½	18	1½	41½	1½	F	15½	3½	¼	1	15½	3½	¼	1	170	37
Ward LaFrance 5A-5-6—1920	3	1½	1½	1½	V	9¼	1½	18	1½	41½	1½	F	18	4	¼	1	18	4	¼	1	170	37
Ward WS2	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	14½	1½	¼	1	14½	1½	¼	1	66	33
Ward WA	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	18	2	¼	1	18	2	¼	1	95	33
Ward WB	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	19½	2	¼	1	19½	2	¼	1	120	33½
Ward WD	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	49½	2½	¼	1	49½	2½	¼	1	144	33½
Ward WF	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	55½	2½	¼	1	55½	2½	¼	1	168	34½
Ward WH	3	1½	1½	1½	V	14½	1½	14	1½	30½	1½	F	68½	3	¼	1	68½	3	¼	1	192	37
Watson B1	4	1½	1½	1½	V	16½	1½	4	1½	40	1½	F	41	1½	¼	1	41	1½	¼	1	90½	30
Watson N-3½	3	1½	1½	1½	V	16½	1½	3	1½	34	1½	F	62	2½	¼	1	47	2½	¼	1	147	37
Watson U-5	3	1½	1½	1½	V	16½	1½	3	1½	38½	1½	F	15½	3½	¼	1	15½	3½	¼	1	36	34
White 15-½	3	1½	1½	1½	V	11	2	8	1½	41	1½	V	13½	3½	¼	4	13½	3½	¼	4	85½	34
White 20-2	3	1½	1½	1½	V	11	2	8	1½	41	1½	V	11½	3½	¼	4	11½	3½	¼	4	107½	34
White 40-3	3	1½																				



## KEY OF ABBREVIATIONS

- Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional
- 1** Engine: Beav—Beaver  
Cont—Continental  
GBS—Golden, Belknap &  
Gr-B—Gray-Beal [Swartz  
Her—Hercules  
Hig—Highway  
Hin—Hinkley  
HSP—Herschell-Spillman  
LeR—Le Roi  
Lib—Liberty  
LMF—Light Mfg. & Fdy.  
Lyc—Lycoming  
Mid—Midwest  
Rut—Rutenber  
Ster—Sterling  
Sup—Supreme  
TC—Twin City  
Vict—Victory  
Wau—Waukesha  
Wei—Weidely  
Wis—Wisconsin
- 2** Valve Arrangement: H—Overhead  
L—ELL-Head  
T—TEE-Head  
S—Sleeve
- 3** How Cooled: A—Air  
B—Pump & Thermo  
C—Centrifugal  
G—Gear Pump  
T—Thermo-Syphon
- 4** Radiator (Make): BW—B & W  
Bm—Brenem  
Bus—Bush  
Can—Candler  
Chic—Chicago  
EM—English-Mersick  
Eur—Eureka  
Fed—Fedders  
Flex—Flexo  
GO—G. & O.  
Har—Harrison  
Hoo—Hooven  
Idl—Ideal  
Jam—Jamestown  
Kue—Kuenz  
Liv—Livingston  
Lng—Long  
McC—McCord  
May—Mayo  
Mod—Modine  
Per—Perflex  
R-T—Rome-Turney  
S-W—Sparks-Withington  
Spar—Spartan  
Spec—Special  
Spli—Splitex  
Stan—Standard  
Whee—Wheeler  
C—Cellular  
H—Honeycomb
- 5** Radiator (Type): C—Cellular  
H—Honeycomb
- 6** Lubrication: FS—Force and Splash  
F—Force Feed  
S—Splash  
Carburetor: B&B—Ball & Ball  
Bent—Bennett  
Cart—Carter  
Eag—Eagle  
Ens—Ensign  
Flich—Fletcher  
Holl—Holley  
John—Johnson  
King—Kingston  
Mar—Marvel  
Mas—Master  
Mill—Miller  
Rayf—Rayfield  
Scoe—Scoe  
Strm—Stromberg  
Shk—Shakespeare  
Sheb—Schebler  
Stew—Stewart  
Till—Tillotson  
Zen—Zenith
- 7** Fuel Feed: G—Gravity  
P—Pressure  
V—Vacuum
- 8** Governor: Con—Continental  
Del—Delaney  
Dup—Duplex  
Hin—Hinkley  
Mer—Merrill  
McC—McCanna  
Mon—Monarch  
Mue—Mueller  
Phar—Pharo  
Pier—Pierce  
Rug—Ruggles  
Sim—Simplex  
Wau—Waukesha
- 9** Clutch (Make): B, B—Borg & Beck  
B, Li—Brown-Lipe  
Covt—Covet  
Det—Detlaff  
Full—Fuller  
D, G—Detroit Gear & Mach.  
Hart—Hartford  
HS—Hele-Shaw  
M-E—Merchant & Evans  
Munc—Muncie  
M-P—Muncie Products  
T-D—Twin Disc  
W-C—Warner Corporation  
W-Gr—Warner Gear
- 10** Clutch (Type): D—Disc  
C—Cone  
DP—Dry Plate  
WP—Wet Plate
- 11** Clutch (Type): D—Disc  
C—Cone  
DP—Dry Plate  
WP—Wet Plate
- 12** Ignition System: Amr—American  
AtK—Atwater-Kent  
AuL—Auto-Lite  
Bos—Bosch  
Ber—Berling  
Con—Connecticut  
Del—Delco  
Eis—Eisemann  
Exi—Exide  
Kin—Kingston  
KW—K. W. Ignition Co.  
Lor—Lorraine  
NE—North East  
POL—Prest-O-Lite  
Rm—Remy  
Sim—Simms  
Spl—Splitdorf  
Wag—Wagner  
Wes—Westinghouse
- 13** Engine Starter: AC—Allis-Chalmers  
AL—Auto-Lite  
Bj—Bijur  
Bos—Bosch  
DL—Delco  
Dy—Dyneto  
GD—Gray & Davis  
LN—Leece-Neville  
NE—North East  
RE—Remy  
Wg—Wagner  
USL—U. S. L.  
W—Westinghouse
- 14** Gearset: B, Li—Brown-Lipe  
Covt—Covet  
D-Sea—Driggs-Seabury  
Det—Detroit  
Dun—Dundore  
Durst—Durst  
Full—Fuller  
G-Le—Grant Lees  
MM—Mechanics Mach. Co.  
Munc—Muncie  
M-P—Muncie Products  
Rock—Rockford  
W-C—Warner Corporation  
W-Gr—Warner Gear
- 15** Location of Gearset: A—Amidships  
R—Rear  
U—Unit with engine  
I—Unit with jackshaft
- 16** Universal: A-B—Easton Mch. Co.  
Acme—Acme  
Arv—Arvac  
Bear—Bearings Co.  
Bld—Blood Brother  
Det—Detroit  
Dit—Ditwiler
- 17** Final Drive: B—Bevel Gear  
C—Chain  
I—Internal Gear  
N—Concentric Spur  
P—Spur  
R—Double Reduction  
S—Spiral Bevel  
W—Worm
- 18** Rear Axle (Make): Amr—American  
Badg—Badger  
Col—Columbia  
Stan—Chicago  
Cl—Clark  
Dun—Dunkirk  
Eat—Eaton, Stan-Par  
Hind—Hindley  
Ir M—Iron Mt.  
Keno—Kenosha  
Ken—Kennedy
- 19** Rear Axle (Type): Amr—American  
Badg—Badger  
Col—Columbia  
Stan—Chicago  
Cl—Clark  
Dun—Dunkirk  
Eat—Eaton, Stan-Par  
Hind—Hindley  
Ir M—Iron Mt.  
Keno—Kenosha  
Ken—Kennedy
- 20** Steering Gear: CAS—C. A. S. Products Co.  
Dit—Ditwiler  
Gem—Gemmer  
Jac—Jacox  
Lav—Lavine  
M-P—Muncie Products  
Ros—Ross  
W-C—Warner Corporation  
Woh—Wohlrab
- 21** Wheels: Arc—Archibald  
AuW—Auto Wheel  
Bim—Bimel  
Cla—Clark  
C&M—Crane & McMahon  
Day—Dayton  
Det—Detroit  
E&O—Eberly & Oris  
Hay—Haynes  
Hoo—Hoopes Brothers  
Jon—Jones  
Kel—Kelsey  
Mot—Motor Wheel  
Mut—Mutual  
Nor—Northern  
Pru—Prudden  
Roy—Royer  
Rus—Russell  
Sal—Salisbury  
Sch—Schwartz  
Smi—Smith  
Sta—Stanwell  
StM—St. Mary  
Stn—Standard  
Wal—Walker  
Wan—Wayne  
W-L—Waterhouse & Lester  
Wes—Western Wheel Co.
- 22** Rim Equipment: Bak—Baker  
Det—Detroit  
Fir—Firestone  
Gdy—Goodyear  
Jax—Jaxon  
Kel—Kelsey  
Stn—Stanwell
- 23** Rim Equipment: Bak—Baker  
Det—Detroit  
Fir—Firestone  
Gdy—Goodyear  
Jax—Jaxon  
Kel—Kelsey  
Stn—Stanwell

# Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(Where prices are not given it is because we have been unable to get them from authoritative sources)

\* An asterisk in front of the model name indicates that corrections have been made somewhere in the specifications since the previous month

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		Universal (Make)	Springs (Make)	TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase						
		Make and Model	Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)			Ignition System	Engine Starter			Make	Location	Speeds			
																									Final Drive	Type	Total Gear Ratio
1000 Pounds																											
*Dodge Brothers	885	Own	3 1/4 x 4 1/4	24	L	C	McC	PT	FS	Sheb	V	Wau	Full	DD	Own	NE	AC	Own	Timk	Flot	4.1	19.4	Own	32x4	32x4	22	23
*Seneca M.	1020	LeR	3 1/4 x 4 1/4	15.6	L	L	Kue	C	FS	Sheb	V	Wau	Full	DD	Own	AC	W	W	Timk	Flot	4.75	14.45	Peru	30x3 1/2	30x3 1/2	Day	Jax
*Vim 28	1050	Own	3 1/4 x 4 1/4	15.6	L	L	McC	Fin	FS	Sheb	V	Wau	Full	DD	Own	W	W	W	Own	...	5.5	...	Own	31x4	31x4	Hoo	Fir
*Vim 30	1175	Own	3 1/4 x 4 1/4	16.6	L	L	McC	Fin	FS	Sheb	V	Wau	Full	DD	Own	W	W	W	Own	...	5.5	...	Own	32x4 1/2	32x4 1/2	Hoo	Fir
1500 Pounds																											
*Acson Fast	885	Own	3 1/4 x 5	22.5	L	L	GO	C	F	Sheb	V	Wau	Full	DD	Own	W	GD	Full	Timk	1 1/2 FI	6.25	25	Timk	34x5	34x5	Bim	...
*Acme G.	915	Own	3 1/4 x 5	22.5	L	L	GO	C	F	Sheb	V	Wau	Full	DD	Own	GD	AC	Full	Timk	1 1/2 FI	6.2	24.8	Timk	35x5	35x5	Bim	...
*Brockway E.	745	Own	3 1/4 x 5	22.5	L	L	GO	C	F	Sheb	V	Wau	Full	DD	Own	AC	RE	Full	Col	1 1/2 FI	25	...	Col	33x4	33x4	...	...
*Chevrolet 18	1890	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Clydesdale 15	1495	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Globe D-20	2200	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*H. R. L.	1300	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Intercontinental Speed Truck S.	1500	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Kearns 7	1300	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Napoleon 7	1300	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Rainier R1	1250	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Republic 75	1395	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Stanton 15	1240	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Stoughton C.	1385	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Triangle A.	1865	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Watson B.	2400	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*White 15	2050	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Yellow Cab M-21	2050	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
1 Ton																											
*Acson R.	1450	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Acme B.	1450	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Atlas Merchant's Dispatch	1550	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Avery	1960	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Beck Hawkeye A.	1495	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Bell M.	1505	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Belmont	1505	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Bessener	1505	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Birch 1	1125	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Briscoe 4-34	1085	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Chevrolet T.	2385	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Clydesdale 20	2200	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Corbett EX	1800	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Corbitt H.	2100	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Day Elder A. (Speed)	1695	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Dearborn E.	1625	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Defiance G.	1750	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Denby 31	2500	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Dependable Dispatch A.	2500	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Diehl A.	2500	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...
*Federal SD.	2500	Own	3 1/4 x 5	22.5	L	L	GO	C	FS	Sheb	V	Wau	Full	DD	Own	RE	AL	Full	W-P	1 1/2 FI	5.1	...	W-P	33x4	33x4	...	...









2360	2370	2380	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500	2510	2520	2530	2540	2550	2560	2570	2580	2590	2600	2610	2620	2630	2640	2650	2660	2670	2680	2690	2700	2710	2720	2730	2740	2750	2760	2770	2780	2790	2800	2810	2820	2830	2840	2850	2860	2870	2880	2890	2900	2910	2920	2930	2940	2950	2960	2970	2980	2990	3000	3010	3020	3030	3040	3050	3060	3070	3080	3090	3100	3110	3120	3130	3140	3150	3160	3170	3180	3190	3200	3210	3220	3230	3240	3250	3260	3270	3280	3290	3300	3310	3320	3330	3340	3350	3360	3370	3380	3390	3400	3410	3420	3430	3440	3450	3460	3470	3480	3490	3500	3510	3520	3530	3540	3550	3560	3570	3580	3590	3600	3610	3620	3630	3640	3650	3660	3670	3680	3690	3700	3710	3720	3730	3740	3750	3760	3770	3780	3790	3800	3810	3820	3830	3840	3850	3860	3870	3880	3890	3900	3910	3920	3930	3940	3950	3960	3970	3980	3990	4000	4010	4020	4030	4040	4050	4060	4070	4080	4090	4100	4110	4120	4130	4140	4150	4160	4170	4180	4190	4200	4210	4220	4230	4240	4250	4260	4270	4280	4290	4300	4310	4320	4330	4340	4350	4360	4370	4380	4390	4400	4410	4420	4430	4440	4450	4460	4470	4480	4490	4500	4510	4520	4530	4540	4550	4560	4570	4580	4590	4600	4610	4620	4630	4640	4650	4660	4670	4680	4690	4700	4710	4720	4730	4740	4750	4760	4770	4780	4790	4800	4810	4820	4830	4840	4850	4860	4870	4880	4890	4900	4910	4920	4930	4940	4950	4960	4970	4980	4990	5000	5010	5020	5030	5040	5050	5060	5070	5080	5090	5100	5110	5120	5130	5140	5150	5160	5170	5180	5190	5200	5210	5220	5230	5240	5250	5260	5270	5280	5290	5300	5310	5320	5330	5340	5350	5360	5370	5380	5390	5400	5410	5420	5430	5440	5450	5460	5470	5480	5490	5500	5510	5520	5530	5540	5550	5560	5570	5580	5590	5600	5610	5620	5630	5640	5650	5660	5670	5680	5690	5700	5710	5720	5730	5740	5750	5760	5770	5780	5790	5800	5810	5820	5830	5840	5850	5860	5870	5880	5890	5900	5910	5920	5930	5940	5950	5960	5970	5980	5990	6000	6010	6020	6030	6040	6050	6060	6070	6080	6090	6100	6110	6120	6130	6140	6150	6160	6170	6180	6190	6200	6210	6220	6230	6240	6250	6260	6270	6280	6290	6300	6310	6320	6330	6340	6350	6360	6370	6380	6390	6400	6410	6420	6430	6440	6450	6460	6470	6480	6490	6500	6510	6520	6530	6540	6550	6560	6570	6580	6590	6600	6610	6620	6630	6640	6650	6660	6670	6680	6690	6700	6710	6720	6730	6740	6750	6760	6770	6780	6790	6800	6810	6820	6830	6840	6850	6860	6870	6880	6890	6900	6910	6920	6930	6940	6950	6960	6970	6980	6990	7000	7010	7020	7030	7040	7050	7060	7070	7080	7090	7100	7110	7120	7130	7140	7150	7160	7170	7180	7190	7200	7210	7220	7230	7240	7250	7260	7270	7280	7290	7300	7310	7320	7330	7340	7350	7360	7370	7380	7390	7400	7410	7420	7430	7440	7450	7460	7470	7480	7490	7500	7510	7520	7530	7540	7550	7560	7570	7580	7590	7600	7610	7620	7630	7640	7650	7660	7670	7680	7690	7700	7710	7720	7730	7740	7750	7760	7770	7780	7790	7800	7810	7820	7830	7840	7850	7860	7870	7880	7890	7900	7910	7920	7930	7940	7950	7960	7970	7980	7990	8000	8010	8020	8030	8040	8050	8060	8070	8080	8090	8100	8110	8120	8130	8140	8150	8160	8170	8180	8190	8200	8210	8220	8230	8240	8250	8260	8270	8280	8290	8300	8310	8320	8330	8340	8350	8360	8370	8380	8390	8400	8410	8420	8430	8440	8450	8460	8470	8480	8490	8500	8510	8520	8530	8540	8550	8560	8570	8580	8590	8600	8610	8620	8630	8640	8650	8660	8670	8680	8690	8700	8710	8720	8730	8740	8750	8760	8770	8780	8790	8800	8810	8820	8830	8840	8850	8860	8870	8880	8890	8900	8910	8920	8930	8940	8950	8960	8970	8980	8990	9000	9010	9020	9030	9040	9050	9060	9070	9080	9090	9100	9110	9120	9130	9140	9150	9160	9170	9180	9190	9200	9210	9220	9230	9240	9250	9260	9270	9280	9290	9300	9310	9320	9330	9340	9350	9360	9370	9380	9390	9400	9410	9420	9430	9440	9450	9460	9470	9480	9490	9500	9510	9520	9530	9540	9550	9560	9570	9580	9590	9600	9610	9620	9630	9640	9650	9660	9670	9680	9690	9700	9710	9720	9730	9740	9750	9760	9770	9780	9790	9800	9810	9820	9830	9840	9850	9860	9870	9880	9890	9900	9910	9920	9930	9940	9950	9960	9970	9980	9990	10000
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Chadwick only





### Chassis Only





[illegible]

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET										REAR AXLE		TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels									
		Make and Model	Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrang't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Type	Total Gear Ratio				Total Gear Ratio	Steering Gear	Front	Rear	Wheels (Make)	Rim Equipment			
5 Ton—Con'd																																					
Master B.	5290	Buda ATU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Master FL	5390	Buda ATU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Master FL	5440	Buda ATU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Memomine J.	5450	Wau DU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Morland 21J	5000	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Nelson & LeMoon FC5	5000	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Ogden G	5000	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Old Reliable D	5000	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
*Oneida E9	5000	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Packard EF	4550	Wau DU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Parker M20	5500	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Pierce Arrow R10	4850	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
*Rainier R-17	5100	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Rowe FW5	5550	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Sandow L	4975	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Sanford W50	5100	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Schwartz	4900	Buda YTU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Schwartz DWS	4900	Buda YTU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Schwartz DWL	4900	Buda YTU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Selden SA	5000	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Service 101	5300	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Signal R	4400	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
*Standard 5K	4950	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
*Sterling 5-Worm	4950	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Super Truck 100	5500	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Tiffin TW	5300	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Titan 6	5400	Buda YTU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Twin City 4-WL Drive D A	5250	Wau DU	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
U. S. T	5600	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Walker 8	5590	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Ward La France 5A	5590	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
White 45	4500	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Wilcox F	4520	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Wilson H	4520	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
Winther 109	5250	Cont B2	4 1/2 x 6	36.1	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x6	Smi	Way	Gdy	9200	170.72	9200	170.72	
5 1/2, 6 and 7 Ton																																					
Available H7	6000	Her T3	5 x 6	40	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	14	74.90	Ros	36x6	40x14	Smi	Way	Gdy	10300	190.75	10300	190.75	
Bartlett 70	7350	Wau DU	5 x 6	40	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	Opt	A	A	4	Spic	Det	W	Timk	Flot	14	74.90	Ros	36x6	40x14	Smi	Way	Gdy	10300	190.75	10300	190.75	
Coupe Gear LD6	7350	Wau DU	5 x 6	40	L	PT	Chic	PT	FS	Mas	V	Pier	B-Li</																								



## ELECTRIC COMMERCIAL CARS

Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Spring	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
Ward WS 2	750	1500	.....	13	Opt	45	G-E	Own	4	W	Shel	Shel	32x3	32x3	Own	88	60
C-T BR 1	1000	2000	2120	14	Opt	60	G-E	Own	4	C-T	Shel	Shel	36x3 1/2	36x3 1/2	W	89 1/4	60
Walker M	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3 1/2	Ross	94	66
Atlantic 1C	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
Ward WA	1250	2730	.....	12	Opt	45	G-E	G-E	4	W	Shel	Shel	32x3	34x3 1/2	Own	90	60
C-T BR 2	2000	2400	2400	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3 1/2	36x4	W	101	60
C-T BR 2A	1500	2200	2200	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3 1/2	W	91 1/2	60
Lansden BG 3 1/2	.....	1400	1600	15	Opt	50	G-E	G-E	4	R	Flot	.....	32x4 1/2	32x4 1/2	Lav	90	50
Lansden MC 1	.....	2900	1850	12	Opt	50	G-E	G-E	4	C	Flot	.....	36x3	36x3 1/2	.....	108	60
Steinmetz	1500	1900	.....	16 1/2	Opt	45	Diehl	Own	4	B	Own	.....	33x5	33x5	.....	114	60
Walker K	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3 1/2	36x4	Ross	96	66
Ward WB	2000	3430	.....	10	Opt	40	G-E	G-E	4	W	Shel	Shel	34x3 1/2	36x4	Own	102	60
Atlantic 2C	4000	3590	.....	11	Opt	60	G-E	G-E	4	C	Timk	S-El	34x4	36x3 1/2	Ross	115	65
C-T BR 4	4000	4400	2800	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4 1/2	W	116	60
Lansden MD 2	.....	4400	2250	11	Opt	50	G-E	G-E	4	C	Flot	.....	36x4	36x3 1/2	.....	120	60
Walker L	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
Ward WD	4000	4500	.....	8.5	Opt	35	G-E	G-E	4	W	Shel	Shel	36x4	36x7	Own	114	60
Atlantic 3C	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	38x5	40x5 1/2	Ross	135	65
C-T AK 7	7000	5800	4200	11	Opt	50	G-E	Own	4	I	Dead	Shel	38x6	38x4 1/2	W	122	55
Lansden ME 3 1/2	.....	5700	2950	10	Opt	45	G-E	G-E	4	C	Flot	.....	38x5	38x4 1/2	.....	133	66
Ward WF	7000	6600	.....	7	Opt	30	G-E	G-E	5	W	Shel	Shel	36x5	36x3	Own	132	70
Atlantic 5C	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5 1/2	Ross	144	65
Couple Gear H	7000	9000	4750	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55
Couple Gear A	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	75
C-T AK 10	10000	6500	4400	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5 1/2	W	132	55
Lansden MT 5	.....	7500	3350	10	Opt	40	G-E	G-E	4	R	Flot	.....	36x6	36x5 1/2	.....	146	60
Lansden MG 6	.....	8900	.....	7	Opt	35	G-E	G-E	4	R	Flot	.....	36x7	36x6 1/2	.....	156	60
Walker P	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	38x5	40x5 1/2	Ross	131	66
Walker N	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	38x6	40x6 1/2	Ross	141	66
Ward WH	10000	8375	.....	6	Opt	26	G-E	G-E	5	W	Shel	Shel	38x7	40x10	Own	144	70
Atlantic 6C	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
Couple Gear LD	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55

## Manufacturers and Models Included in Specifications on Preceding Pages

Acason—1/4, 1, 1 1/2, 2 1/2, 3 1/2, 5—Acason Motor Truck Co., Detroit Mich.

Ace—1 1/2, 2 1/2—American Motor Truck Co., Newark, Ohio.

Acme—1/4, 1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Acme Motor Truck Co., Cadillac, Mich.

Ajax—3 1/2—Ajax Motors Corp., Boston, Mass.

Akron Multi-Truck—1 1/2—Thomart Motor Truck Co., Kent, Ohio.

American—2 1/2, 4—American Motor Truck & Tractor Co., Portland, Conn.

Apex—1, 1 1/2, 2 1/2, 3 1/2—Hamilton Motor Co., Grand Haven, Mich.

Armleder—1, 2 1/2, 3 1/2—O. Armleder Co., Cincinnati, Ohio.

Atco—1 1/2, 2 1/2—American Truck & Trailer Corp., Kankakee, Ill.

Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.

Atlas—1—Atlas Truck Corp., York, Pa.

Atterbury—1 1/2, 2 1/2, 3 1/2, 5—Atterbury Motor Car Co., Buffalo, N. Y.

Autocar—2, 3 1/2, 5 1/2—Autocar Co., Ardmore, Pa.

Available—1 1/2, 2, 2 1/2, 3 1/2, 5, 7—Available Truck Co., Chicago, Ill.

Avery—1—Avery Company, Peoria, Ill.

Bartlett—7—Bartlett Truck Co., Chicago, Ill.

Beck-Hawkeye—1, 1 1/2, 2, 3—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.

Bell—1, 1 1/2, 2 1/2—Bella Motor Truck Co., Ottumwa, Ia.

Belmont—1, 1 1/2, 2, 3 1/2—Belmont Motors Corp., Lewistown, Pa.

Bessemer—1, 1 1/2, 2 1/2, 4—Bessemer Motor Truck Co., Grove City, Pa.

Birch—1—Birch Motor Cars, Chicago, Ill.

Bowman—3/4—Bowman Motor Car Co., Covington, Ky.

Bridgeport—1 1/2, 2 1/2, 3 1/2—Bridgeport Motor Truck Co., Bridgeport, Conn.

Brinton—2 1/2—Brinton Motor Truck Co., Philadelphia, Pa.

Briscoe—1—Briscoe Motor Corp., Jackson, Mich.

Brockway—3/4, 1 1/2, 2 1/2, 3 1/2, 5—Brockway Motor Truck Co., Cortland, N. Y.

Buffalo—T—Buffalo Truck & Tractor Corp., Clarence, N. Y.

C. T.—1, 1 1/2, 2, 3 1/2, 5—Commercial Truck Co., Philadelphia, Pa.

Capitol—1 1/2, 2 1/2, 3 1/2—Capitol Motors Corp., Fall River, Mass.

Case—2—J. I. Case Plow Works Co., Racine, Wis.

Chevrolet—3/4, 1—Chevrolet Motor Co. of Mich., Flint, Mich.

Chicago—1 1/2, 2 1/2, 3 1/2, 5—Chicago Motor Truck, Inc., Chicago, Ill.

Climber—1 1/2—Climber Motor Corp., Little Rock, Ark.

Clydesdale—3/4, 1, 1 1/2, 2 1/2, 3 1/2, 5—Clydesdale Motor Truck Co., Clyde, Ohio.

Collier—1, 1 1/2, 2, 2 1/2—Collier Motor Truck Co., Bellevue, Ohio.

Columbia—1 1/2, 2 1/2—Columbia Motor Truck & Trailer Co., Pontiac, Mich.

Commerce—1 1/4, 1 1/2, 2, 2 1/2—Commerce Motor Truck Co., Detroit, Mich.

Concord—1 1/2, 2, 2 1/2, 3—Abbott-Downing Truck & Body Co., Concord, N. H.

Corbitt—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Corbitt Motor Truck Co., Henderson, N. C.

Couple Gear—3 1/2, 6—Couple Gear Electric Truck Co., Grand Rapids, Mich.

Cyclone—1 1/2—The Cyclone Motor Corp., Greenville, S. C.

Dart—1 1/2, 2 1/2, 3 1/2—Dart Truck & Tractor Corp., Waterloo, Ia.

Day-Elder—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Day-Elder Motors Corp., Newark, N. J.

Dearborn—1, 1 1/2, 2—Dearborn Truck Co., Chicago, Ill.

Defiance—1, 1 1/2, 2—Defiance Motor Truck Co., Defiance, Ohio.

Denby—1, 1 1/2, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.

Dependable—1, 1 1/2, 2, 2 1/2, 3 1/2—Dependable Truck & Tractor Co., East St. Louis, Ill.

Diamond T—1 1/4, 1 1/2, 2, 3 1/2, 5—Diamond T Motor Car Co., Chicago, Ill.

Diehl—1, 1 1/2—Diehl Motor Truck Works, Philadelphia, Pa.

Doane—2 1/2, 3 1/2, 6—Doane Motor Truck Co., San Francisco, Cal.

Dodge—1 1/2—Dodge Bros., Detroit, Mich.

D-Olt—1 1/2—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.

Dorris—2, 3 1/2—Dorris Motor Car Co. St. Louis, Mo.

Double Drive—4—Double Drive Truck Co., Chicago, Ill.

Douglas—1 1/2, 2, 3—Douglas Motors Corp., Omaha, Neb.

Duplex—2, 3 1/2—Duplex Truck Co., Lansing, Mich.

Duty—2—Duty Motor Co., Greenville, Ill.

Eagle—2—Eagle Motor Truck Corp., St. Louis, Mo.

Erie—1 1/2, 2 1/2—Erie Motor Truck Mfg. Co., Erie, Pa.

F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.

Facto—2 1/2—Facto Motor Trucks, Springfield, Mass.

Fageol—1 1/2, 2 1/2, 3 1/2, 5—Fageol Motors Co., Oakland, Cal.

Fargo—2—Fargo Motor Truck Co., Chicago, Ill.

Federal—1, 1 1/2, 2, 3 1/2, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.

Ford—1—Ford Motor Co., Highland Park, Mich.

Forschler—1, 1 1/2, 2, 3—Forschler Motor Truck Mfg. Co., New Orleans, La.

Front Drive—1 1/2—Double Drive Truck Co., Chicago, Ill.

Fulton—1, 2, T.T.—Fulton Motors Corp., Farmingdale, N. Y.

G. M. C.—1, 2, 3 1/2, 5—General Motors Truck Co., Pontiac, Mich.

G. W. W.—1 1/2—Wilson Truck Mfg. Co., Henderson, Ia.

Garford—3/4, 1 1/2, 2, 3 1/2, 5, 7 1/2—Garford Motor Truck Co., Lima, O.

Gary—1 1/2, 2 1/2, 3 1/2, 5—Gary Motor Truck Co., Gary, Ind.

Gersix—1 1/2, 2 1/2, 3—Gersix Mfg. Co., Seattle, Wash.

Giant—1 1/2, 2 1/2, 3 1/2, 5—Giant Truck Corp., Chicago Heights, Ill.

Globe—3/4—Globe Motors Co., Cleveland, Ohio.

Gove—2 1/2—Gove Motor Car Co., Detroit, Mich.

Graham—1 1/2—Graham Brothers, Evansville, Ind.

Gramm-Bernstein—1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.

Hal-Fur—2, 3 1/2—Hal-Fur Motor Truck Co., Cleveland, Ohio.

Hall—2 1/2, 3 1/2, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.

Hawkeye—1 1/2, 2, 3 1/2—Hawkeye Truck Co., Sioux City, Ia.

Hendrickson—2 1/2, 3 1/2, 5—Hendrickson Motor Truck Co., Chicago, Ill.

Highway-Knight—4, 5—Highway Truck Corp., Chicago, Ill.

Higrade—1, 1 1/2—Higrade Motors Co., Harbor Springs, Mich.

Holmes—2—Holmes Motors Mfg. Co., Littleton, Colo.

H. R. L.—3/4, 1 1/2, 2 1/2—H. R. L. Motor Co., Seattle, Wash.

Huffman—1 1/2—Huffman Bros. Co., Elkhart, Ind.

Hurlburt—1 1/2, 2 1/2, 3 1/2, 5—Hurlburt Mfg. & Boiler Co., Harrisburg, Pa.

Huron—1 1/2, 2 1/2—Huron Truck Co., Bad Axe, Mich.

Independent—1 1/2, 2 1/2, 3 1/2—Independent Motor Co., Youngstown, Ohio.

Independent—1 1/2, 2 1/2—Independent Motor Truck Co., Inc., Davenport, Ia.

Indiana—1 1/2, 2, 2 1/2, 3 1/2, 5—Indiana Truck Corp., Marion, Ind.

International—1, 1 1/2, 2, 3, 5—International Harvester Co., Chicago, Ill.

Italia—2, 3, 5—Italia Motor Truck Co., San Francisco, Cal.

Jackson—3 1/2—Jackson Motors Corp., Jackson, Mich.

Jumbo—1 1/2, 2, 2 1/2, 3, 3 1/2, 4—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—1 1/2, 2 1/2, 3 1/2—Kalamazoo Motor Corp., Kalamazoo, Mich.

Kearns—3/4, 1 1/2—Kearns-Dughie Motors Co., Danville, Pa.

Kelly-Springfield—1 1/2, 2 1/2, 3 1/2, 5, 6—Hare's Motors, Inc., New York, N. Y.

Keystone—2—Keystone Motor Truck Corp., Philadelphia, Pa.

Kimball—2, 2 1/2, 3, 4, 5—Kimball Motor Truck Co., Los Angeles, Cal.

Kissel—1, 1 1/2, 2 1/2, 4, 5—Kissel Motor Car Co., Hartford, Wis.

Kleiber—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Kleiber & Co., Inc., San Francisco, Cal.

Koehler—1 1/2, 2 1/2, 3 1/2, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.

Lange—2—Lange Motor Truck Co., Pittsburgh, Pa.

Lansden—3/4, 1, 2, 3 1/2, 5, 6—Lansden Company, Danbury, Conn.

Larrabee-Deyo—1 1/2, 2 1/2, 3 1/2, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.

L. M. C.—2 1/2—Louisiana Motor Car Co., Shreveport, La.

- Lombard—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.
- Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
- Luverne—2, 3—Luverne Automobile Co., Luverne, Minn.
- Maccar—1½, 2½, 3½, 5—Maccar Truck Co., Scranton, Pa.
- MacDonald—7—MacDonald Truck & Tractor Co., San Francisco, Cal.
- Mack—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.
- Master—1½, 2½, 3½, 5, T.T.—Master Trucks, Inc., Chicago, Ill.
- Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.
- Menominee—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Menominee, Mich.
- Moline—1½—Moline Plow Co., Moline, Ill.
- Moreland—1½, 2½, 4, 5—Moreland Motor Truck Co., Los Angeles, Cal.
- Mutual—2, 2½—Mutual Truck Co., Sullivan, Ind.
- Napoleon—¾, 1, 1½—Napoleon Motors Co., Traverse City, Mich.
- Nash—1, 2—Nash Motors Co., Kenosha, Wis.
- Nelson-LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.
- Netco—2, 2½—New England Truck Co., Fitchburg, Mass.
- Niles—2—Niles Motor Truck Co., Pittsburgh, Pa.
- Noble—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.
- Northway—2, 3½—Northway Motors Co., Natick, Mass.
- Norwalk—1, 1½—Norwalk Motor Car Co., Martinburg, W. Va.
- O. K.—1½, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
- Ogden—1½, 2½, 3½, 5—Ogden Motor Truck Co., Chicago, Ill.
- Old Hickory—1—Kentucky Wagon Mfg. Co., Louisville, Ky.
- Old Reliable—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.
- Oldsmobile—1—Olds Motor Works, Lansing, Mich.
- Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.
- Oneida—1½, 1½, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.
- Oshkosh—2—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
- Packard—2, 3, 5—Packard Motor Car Co., Detroit, Mich.
- Palge—1½, 2½, 3½—Palge-Detroit Motor Car Co., Detroit, Mich.
- Parker—2, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.
- Patriot—1, 2, 3—Patriot Motors Co., Lincoln, Neb.
- Penn—2—Penn Motor Corp., Philadelphia, Pa.
- Pierce-Arrow—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
- Pioneer—1—Pioneer Truck Co., Chicago, Ill.
- Pittsburgh—2½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
- Power—1½, 3½—Power Truck & Tractor Co., St. Louis, Mo.
- Premocar—1½—Preston Motors Corp., Birmingham, Ala.
- Rainier—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Flushing, L. I., N. Y.
- Ranger—2—Southern Motor Mfg. Ass'n, Ltd., Houston, Tex.
- Reliance—1½, 2½—Reliance Motor Truck Co., Appleton, Wis.
- Reo—1½—Reo Motor Car Co., Lansing, Mich.
- Republic—¾, 1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.
- Reynolds—1½, 2½, 3½, 5—Reynolds Motor Truck Co., Mt. Clemens, Mich.
- Riker—3, 4—Locomobile Co. of America, Bridgeport, Conn.
- Rowe—1½, 2, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.
- Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.
- Samson—¾, 1½—Samson Tractor Co., Janesville, Wis.
- Sandow—1, 1½, 2, 2½, 3½, 5—Sandow Motor Truck Co., Chicago, Ill.
- Sanford—2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.
- Schacht—2, 2½, 3½, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.
- Schwartz—1½, 1½, 2½, 5—Schwartz Motor Truck Co., Reading, Pa.
- Selden—1½, 2½, 3½, 5—Selden Truck Corp., Rochester, N. Y.
- Seneca—1½—Seneca Motor Car Co., Fostoria, Ohio.
- Service—1, 1½, 2, 2½, 3½, 5—Service Motor Truck Co., Wabash, Ind.
- Signal—1, 1½, 2½, 3½, 5—Signal Motor Truck Co., Detroit, Mich.
- Southern—1, 1½, 2—Southern Truck & Car Corp., Greenboro, N. C.
- Standard—1, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.
- Steinmetz—¾—Steinmetz Electric Motor Car Corp., Baltimore, Md.
- Sterling—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.
- Stewart—¾, 1, 1½, 2, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.
- Stoughton—¾, 1, 1½, 2, 3—Stoughton Wagon Co., Stoughton, Wis.
- Success—2½—Webberville Truck Co., Webberville, Mich.
- Super Truck—2½, 3½, 5—O'Connell Motor Truck Co., Waukegan, Ill.
- Superior—1, 2—Superior Motor Truck Co., Atlanta, Ga.
- Tiffin—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.
- Titan—2½, 3½, 5—Titan Truck Co., Milwaukee, Wis.
- Tower—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.
- Traffic—1½, 2, 3—Traffic Motor Truck Corp., St. Louis, Mo.
- Transport—1, 1½, 2½, 3½—Transport Truck Co., Mt. Pleasant, Mich.
- Traylor—1½, 2, 3, 4, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.
- Triangle—¾, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.
- Triumph—1½, 2½—Triumph Truck & Tractor Co., Kansas City, Mo.
- Twin City—F. W. D., 3½, 5—Twin City Four-Wheel Drive Co., Inc., St. Paul, Minn.
- Twin City—2, 3½—Minneapolis Steel & Mach. Co., Minneapolis, Minn.
- Ultimate—1½, 2, 2½, 3—Vreeland Motor Co., Inc., Newark, N. J.
- Union—2½, 4, 6—Union Motor Truck Co., Bay City, Mich.
- United—1½, 2½, 3½, 5—United Motors Co., Grand Rapids, Mich.
- Ursus—1, 1½, 2½, 3½—Ursus Motor Co., Inc., Chicago, Ill.
- U. S.—1½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.
- Velle—1½—Velle Motors Corp., Moline, Ill.
- Vim—½, 1, 2, 3—Vim Motor Truck Co., Philadelphia, Pa.
- Vulcan—2½—Vulcan Mfg. Co., Seattle, Wash.
- Walker—¾, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.
- Walker-Johnson—2½—Walker-Johnson Truck Co., Woburn, Mass.
- Walter—5—Walter Motor Truck Co., New York, N. Y.
- Ward—¾, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
- Ward La France—2½, 3½, 5—Ward La France Truck Co., Inc., Elmira, N. Y.
- Watson—¾, 3½, T.T.—Watson Wagon Co., Canastota, N. Y.
- White—¾, 2, 3½, 5—White Co., Cleveland, Ohio.
- White Hickory—1, 1½, 2½—White Hickory Motor Corp., Atlanta, Ga.
- Wichita—1, 1½, 2, 2½, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.
- Wilcox—1, 1½, 2½, 3½, 5—H. E. Wilcox Motor Co., Minneapolis, Minn.
- Wilson—1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.
- Winther—1, 1½, 2, 2½, 3½, 5, 7—Winther Motor Truck Co., Kenosha, Wis.
- Wisconsin (Loganville)—2, 2½—Wisconsin Truck Co., Loganville, Wis.
- Wisconsin (Sauk City)—1, 1½, 2½, 3½—Wisconsin Farm Tractor Co., Sauk City, Wis.
- Witt-Will—1½, 2—Witt-Will Co., Inc., Washington, D. C.
- Wolverine—1, 1½, 2, 2½, 3½—American Commercial Car Co., Detroit, Mich.
- Yellow Cab—¾, 1—Yellow Cab Mfg. Co., Chicago, Ill.
- Young—1, 2, 3½—The Young Motor Truck Co., Euclid, Ohio.

## New Plant Fire Control

A fire alarm and what is perhaps the largest watchman's control board yet built, was recently installed in the plant of the Kelly-Springfield Tire Co., Cumberland, Md. The new buildings cover twelve acres and provide 22 acres of floor space. The material required for this modern factory was enough to make a train fifty miles long. Recognition of the stupendous annual fire wastage, both monetarily and in human casualties, prompted this tire company to extend itself in an effort to curtail and control the fire menace.

The board shown here, which measures 9 ft. 8 in. by 6 ft. 2 in., is the "heart" of a complete Fire and Watchman's System, which is safeguarding the factory twenty-four hours of the day. When a fire-box is pulled in any part of the building, a huge electrically operated steam whistle, which can be heard all over the valley, is automatically sounded.

Should it be found necessary to clear any floor in any part of any building, this is accomplished by signal bells which are operated from the control board. Signals for fire-drills or for starting and stopping work in the whole or certain parts of the factory may also be given from the board. A unique feature of this control board is the watchman's signals.

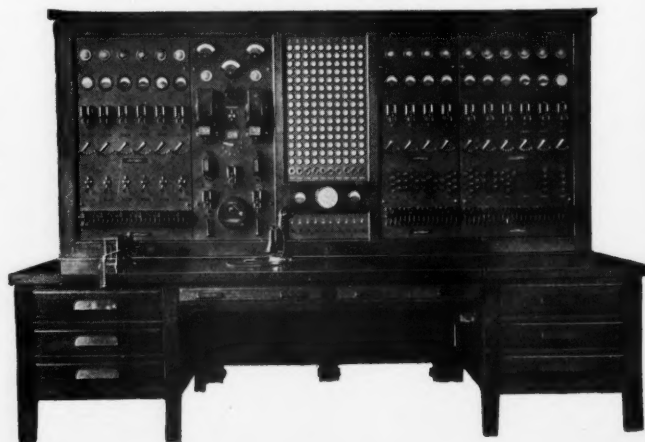
As the several watchmen go from station to station, the head watchman at the desk can observe their progress by the proper sequence of the lamp signals (see center of board). A number of the combined Fire and Watchman's Stations are equipped with telephones, and should a watchman miss a station he can be caught almost at the next station by telephone, enabling the chief at the board to ascertain at once why that station was passed. In this way, however lonely, hazardous or distant the trips, the watchmen are never out of immediate touch with the man at the desk. In addition, and as a further precaution, an indelible record is made by a punched hole in a properly timed and spaced dial sheet of every station visited by every watchman.

Fire Control Board of One of the Largest Industrial Fire Alarm Systems Installed.

Even if the head watchman is inclined to overlook the missing of a station here and there, he cannot get away from the dial record which is kept under lock and key in the clock cabinet.

The watchman's clock stands 8 ft. 6 in. high. Only the general manager or some other high executive has the key to the clock cabinet, and the records made on the dial sheet thereon are final.

This control board, including wiring, circuits, fire and watchman's boxes and stations, were designed and manufactured by The Holtzer-Cabot Electric Co., Boston, Mass.





# Metal and Rubber Markets

## Fall Trade in Steel Industry Improving

Fall trade in the steel industry is opening with an all around stronger sentiment, but as yet with no substantial improvement in the volume of tonnage placed. The period of extreme depression, however, has apparently passed, and from now steady but slow progress is expected.

The tonnage of managanesee steel placed during the last four or five weeks has been slightly heavier in comparison with recent months. The tractor industry is still dormant.

### Steel Products Prices

Per ton—Pittsburgh—

Bessemer billets .....	\$29 00 a	30 00
Open hearth .....	29 00 a	30 00
Forging billets .....	34 00 a	35 00
Sheet bars .....	30 00 a	32 00

### Sheets

The following prices are for 100-bundle lots and over, f.o.b. mill:

Blue Annealed Sheets—

Pittsburgh (base) .....	\$2 50 a	....
Philadelphia .....	2 85 a	....
New York .....	2 88 a	....
Galvanized Sheets of Black Sheet Gauge—		
Pittsburgh .....	\$4 00 a	....
New York .....	4 38 a	....

### Finished Iron and Steel

Tank plates, Pittsburgh .....	\$1 60 a	1 65
Tank plates, New York .....	1 98 a	2 03
Steel bars, New York .....	1 98 a	2 08
Steel bars, Pittsburgh .....	1 60 a	1 70

### Iron and Steel at Pittsburgh

Bessemer iron .....	\$21 96 a	....
Skelp, grooved steel .....	1 70 a	1 80
Skelp, sheared steel .....	1 70 a	1 80
Strip steel, cold .....	3 75 a	4 00
Strip steel, hot .....	2 25 a	2 40
Ferromanganese (78-82%) .....	60 00 a	63 00
Steel, melting scrap .....	14 00 a	....

### Miscellaneous Metals

Copper sheets, hot rolled .....	\$19 50 a	....
Copper rolls .....	18 00 a	....
Copper bottoms .....	27 00 a	....
Copper rods .....	18 00 a	18 75
Seamless tubing, bronze .....	20 50 a	....
Seamless tubing, copper .....	19 50 a	....
Seamless low brass tubing .....	19 50 a	....
Seamless high brass tubing .....	18 00 a	....
High brass rods .....	13 25 a	....
Low brass rods .....	17 75 a	....
Brazed tubing, brass .....	25 00 a	....
Brazed tubing, bronze .....	29 75 a	....
Brazed tubing, copper .....	29 75 a	....

**ANTIMONY**—Demand continues light, and while sellers are not forcing the market, buyers offer no encouragement.

**MANGANESE**—No business to speak of. Lowering of prices per unit no attraction.

**OLD METALS**—Aluminum scrap continues quiet but steady. Scrap copper is strong, especially in the case of heavy cut and crucible. Block tin scrap and pewter dishes are still active and reported scarce. Latest buying and selling

prices, f.o.b. cars New York follow:

Aluminum—	Buying.	Selling
Cast scrap .....	8 a 8½	9 a 9½
Sheet scrap .....	8 a 8½	8½ a 9½
Clippings .....	11½ a 12	13 a 14

### Copper—

Heavy machinery comp. ....	7¼ a 7½	8¼ a 8½
Light and bottoms .....	7½ a 8	8¼ a 8½
Heavy, cut and crucible ..	9½ a 10	10½ a 11¼
Brass, heavy .....	4¼ a 4½	4½ a 5
Brass, casting .....	5¼ a 5½	5½ a 6¼
Brass, light .....	3¼ a 3½	4 a 4¼
No. 1 clean brass turnings ..	4 a 4½	4½ a 4¾
No. 1 comp. turnings .....	5¼ a 6	6¼ a 6½
Tea lead .....	2½ a 2¾	2¾ a 3
Lead, heavy .....	3¼ a 3½	4 a 4¼
Zinc scrap .....	2 a 2½	2½ a 3
Solder joints .....	4¼ a 5	5¼ a 5½
New zinc clippings .....	3 a 3¼	3¼ a 4
Pewter dishes .....	14¼ a 14½	15 a 16
Block tin, scrap .....	22 a 23	24 a 25

### Rubber Quiet

Market for plantation rubber still quiet. Demand from large dealers still lacking, and that from other quarters of limited

extent. Steady tone continues. Paras also quiet.

Para—Up-river, fine .....	21 a	21½
Up-river, coarse .....	11½ a	....
Island, fine .....	18 a	18½
Island, coarse .....	9¼ a	9½
Caucho, ball, upper .....	11½ a	....
Caucho, ball, lower .....	9¼ a	10
Cameta .....	9 a	9¼
Amber—No. 1 .....	14 a	....
No. 2 .....	13 a	....
No. 3 .....	12 a	....
Smoked ribbed sheets .....	15¼ a	....
*Centrals—Corinto .....	a	6
*Esmeralda .....	a	6
*Mexican scrap .....	a	5
*Guayule, wet .....	a	10
*Guayule, dry .....	a	25
*Balata, block, Trinidad .....	a	73
*Balata, block, Colombian ..	a	26
*Balata, Panama .....	a	25
*Balata, sheet .....	a	58

\*Nominal

**SCRAP RUBBER.**—On the advance of crude rubber, dealers in scrap rubber are placing their hope for better business, as present trading is spotty.

Inner tubes, No. 2 .....	a	2
Inner tubes, No. 1 .....	a	4½
Tires—Automobile .....	½ a	....

## Interest in Road Improvement Maintained

According to figures compiled from reports submitted from states, counties, cities and townships to The Asphalt Association, New York, for the month of July, the value of contemplated bond issues for highway work dropped \$25,562,105.36 below the figures for June. The showing is encouraging in view of the fact that paving bond issues generally are provided in the early part of the year and in the fall. That the reduction does not materially affect the highway construction boom is shown when it is realized that

the total amount of bonds actually voted up to January 1, 1914, as ascertained by the U. S. Office of Public Roads was only \$445,147,073.

July reports showed contemplated improvements, both in road-building and street construction, amounting to \$153,745,254, with 345 projects, compared to \$179,307,359.36 for 310 projects in June. The reports for May showed contemplated bond issues amounting to \$164,371,353 and a total of 259 projects. During the three months 914 projects were reported with a total of \$597,423,966.36 in contemplated bond issues.



Complete Bowser Crankcase Oil Reclaiming Installation Operated by a Fort Wayne Concern

This will convey a clear idea of the appearance and general arrangement of the oil reclaiming outfit recently announced by the S. F. Bowser & Co., Inc., Fort Wayne, Ind., and described in the August issue of the Commercial Car Journal, page 74, to those of our readers who are interested. The company using this outfit was recently formed expressly for the purpose of reclaiming motor crank case oil. This oil is collected from the various commercial concerns, garages, repair shops, etc., and reclaimed at a certain flat rate; or, if these concerns do not care to bother with the used oil, the company buys it outright, reclaims it and retails or wholesales the renewed oil, according to market conditions.

## Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

THE COMMERCIAL CAR JOURNAL																									OCTOBER 15, 192																																																																						
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Burdick Tire & Rubber Co., Noblesville, Ind.																																																																																															
Air Bag Cord, non-skid																																																																																															
Canton-Blackstone Co., Youngstown, O.																																																																																															
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## The Industry Needs Good Salesmen

(Continued from page 26)

life, and hard study and application will acquaint a layman with a knowledge of truck selling that will make him invaluable.

The new application of vocational selling has increased the importance of salesmen from other walks of life. A sales manager from one of Philadelphia's prominent dealers has evolved a plan for the vocational idea which is meeting with much success. A salesman is queried as to his knowledge of any industry outside of the automobile industry. If, for example, he shows a leaning toward the ice cream business, he is given charge of all prospects and customers in this and allied industries, such as the confectioner, the baker, the flourman, the milk business. Such vocations as the iron and steel business, the coal business, the lumber business, etc., are given to another salesman. This sales manager finds that his man becomes familiar with three or four allied industries, which makes him of great value in advising and analyzing prospects.

The disadvantages of this system are very pronounced in a large city. A salesman in this system in New York City might be at Battery Park in the morning, Yonkers at noon, and Columbus Circle in the evening. Manufacturers in a large city are too widely scattered to permit a salesman to make many calls during a day.

The sectional system seems the best, then, for a large metropolis. One distributor seems to have overcome the difficulty by a sort of combination vocational-sectional system. The city is divided into territories and a salesman assigned to each one. If in any particular territory there is a big concern using an enormous fleet of trucks, the big concern is handled by a special salesman, the dealer's best one, who makes his weekly calls. This salesman has all the largest users, and as the number is usually small, he is able to cover all the prospects effectively. The ordinary territory salesman might not be able to see the big user in his territory more than once a month.

The scarcity of salesmen need evoke no alarm. The condition should be righted by spring. The situation does teach us some very important facts.

The dealer must give more attention to his salesmen. They must be continually filled with enthusiasm and pre-war pep. They must be stimulated with good bonus systems and made to feel that hard work, mixed with the right application of brains, is appreciated, even though great results are not forthcoming at the present moment.

Greater care must be taken in the selection of salesmen. The floater and money grabber must be kept out.

Infinite pains must be taken in the training of green salesmen. Now is the best time for salesmanship training, as buyers are few and many owners are "shopping."

The success of the present situation will depend on the salesman. With the aid of his hard work, business will blossom in 1922.

# Taken From Current House Organs

## The "Turn Over" in Knowledge

Every production of genius, whether book, picture, machine or liquid—is composed of ordinary materials!

Machines are nothing but combinations of metals. Put them together in one way and you get a make-shift; combine them with genius (remember Whistler's remark about "paint mixed with brains?") and you get a marvel such as the locomotive, the automatic lathe, the wireless.

Always and always, the materials are the ordinary things about us. The extraordinary thing about radium wasn't radium that has been in existence for eternity. The isolating of the substance and the use of it were the great things.

Which brings me to my point;—"turn over" as a law of success applies to the mind as well as to other merchandise. Your brain is a store house with the emphasis on the store. From it, you disburse merchandise in the way of thoughts, feelings and actions.

Pack it as much as you like, learn all sorts of things, and if you do not distribute, turn over, sell or otherwise make useful and effective that store of learning you are an educated fool and nothing else. The test of a man is never what you know. The test is **what do you make useful and effective** of what you know!

A man who knows ten things and uses them all the time is more useful to himself and his fellow men than the man who knows a hundred things and never makes use of one! The first man, at least knows the secret of **turn over**. Idle knowledge is like idle machinery and idle men—wasted. Take the things you know, combine them with the ordinary materials about you and **go to work**.—*Helix*, Greenfield Tap & Die Corp., Greenfield, Mass.

## More Money Spent on Rural Roads

During the calendar year 1919, forty-six states expended over \$500,000,000 on their rural roads and bridges, the Bureau of Public Roads of the U. S. Department of Agriculture recently announced. This total is made up of the actual cash expenditures for such items as labor, materials, supervision, and administration, amounting to \$389,455,931, and convict labor and statute labor, the value of which, not definitely known, is estimated at about \$132,000,000.

The road and bridge expenditures for 1919 show an increase of approximately 33 1-3 per cent over those in 1914. More striking, however, is the increase in the proportion of the total funds supervised by the several State Highway Departments. In 1918 the expenditures by or under the supervision of the State Highway Departments amounted to \$117,285,268, while the local funds, over which they exercised no control whatever, amounted to \$168,812,925. In 1919, however, the

State Highway Departments supervised the expenditure of \$200,292,694 as against the total of \$189,163,237 expended by the local road and bridge authorities.—*Highway Magazine*, American Rolling Mill Co., Middletown, O.

## Rose-Colored Spectacles

Many a salesman saw his market through rose-colored glasses in the first riotous year after the Treaty of Versailles.

It made a pretty and comforting picture. Buyers clamoring for his goods; two sales where one ordinarily grew. What need for sales arguments? What necessity to spend money on advertising?

Good salesmen have long since discarded their rosy spectacles. Salesmanship is back in the saddle.

The leaders in all lines are getting their names and their products back into the magazines and newspapers. But gone is the short hour of the flowery, generalizing advertisement. Real facts and sound ideas—selling arguments—are the advertising order of the day.

Slowly but surely the man on the road is relearning a lesson he had almost forgotten—not to be discouraged by a buyer's first "No." And in this, advertising is one of the ways the manufacturer and the sales manager are driving the lesson home.—*Critchfield's Commentary*, Critchfield & Co., Chicago, Ill.

## The Fable of the Ouija Board

Once upon a time, even before the cost of trousers and boots had aviated, there were two salesmen who proffered the same commodity to the same willing or otherwise prospective purchasers.

Now each of these salesmen had a system. And like all followers of things systematic, each believed his brand would put it across big. But one salesman overlooked the slight detail of picking the right system.

For when the adding machines had totaled the results, the discerning sales manager perceived from the added sums that one salesman had been highly successful and one has been highly vice-versa.

Whereupon the D. S. M. was behooved to ascertain why the one salesman was so much and the other was so little. So the D. S. M. donned his gum shoes and tracked a ouija board to its lair and choked the secret from the O. B. in spirit language as follows: i. e., to wit—"One salesman, he who is successful, wears out one pair of trousers to two pairs of boots while the salesman, he who ain't, wears out two pairs of trousers to one pair of boots."

Thereupon the D. S. M. evolved this moral. One boot occasionally applied to the seat of the trousers of some salesmen accelerate the spirits of activity.—*Acme Angles*, Acme Motor Truck Co., Cadillac, Mich.

## Don't be a "Floppenwash"

Don't be a "Floppenwash"—you probably won't be able to find that word in Mr. Webster's dictionary. I'll tell you that now and save you the bother of looking it up.

Well, anyway my definition of a "Floppenwash" is a man who has a family of kiddies and who is so far away from their ideas and ideals as to cause the youngsters to hide behind mother's skirts when he comes home at night.

In my day I have seen many species of "Floppenwashes" but the worst one of all is the one who allows his youngsters to grow-up fearing him instead of being their pal and buddy.

The real human being who is the direct antithesis of a "Floppenwash" is the Dad whose greatest joy in life is when the day's work is done comes home and casts off the artificial convention of dignity—sans coat and collar—and with joy unconfined enters into the joy of living—the joy of a romp with the kids.

Ask yourself these questions? When you come home from your business are you met at the gate or at the top of the stairs by a toddling bunch of innocence? Do you pick up a pink cooing baby or take it from the sheltering arms of a tired mother and toss it high and then hold it close to your breast and bite its fat, chubby hands? Do you?

If you don't you are a "Floppenwash" and need to be examined for what ails you and besides you as a father and a teacher are missing the greatest happiness in life.

Don't get the idea that because you are a business success that you must carry your put-on stiff necked dignity into your home—by so doing you are only fooling yourself and missing the joy that only comes to a man when he becomes a real honest-to-goodness pal and Dad.

Loosen up—get down on your hands and knees, put Bill on your back and Bob at your head and be a bucking broncho, toss the kid high and make him like it and when you do that those little lives will entwine themselves into your life and you will grow up with them.

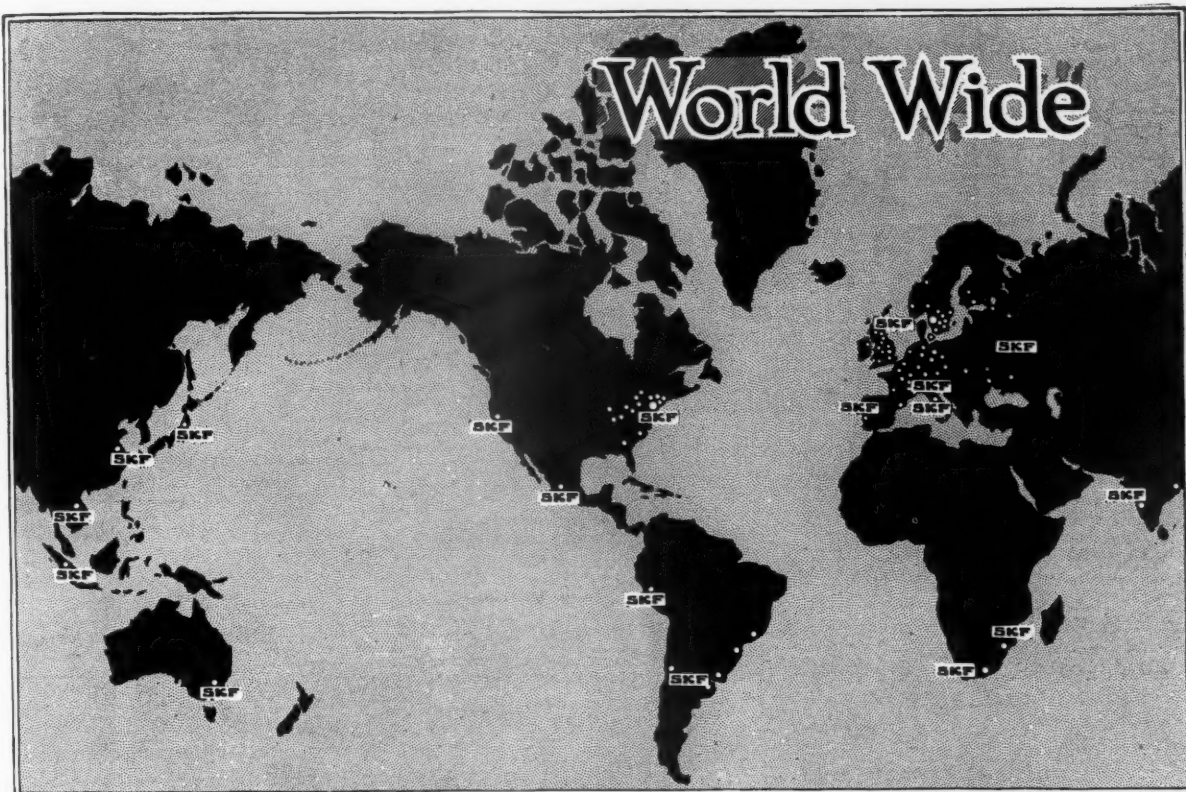
If by any chance you are a "Floppenwash" or bordering on one shake it before it is too late and tonight when you get home don't sneak off to a quiet corner to read your paper and leave instructions with mother that the kids are not to bother you. Don't do it! But instead, get a half-Nelson on one of them, roll on the floor, muss up things—make a fool of yourself—a regular boy—not only for their sake but the sake of their mother.

Will they like it? I'll say they will, and besides they will remember those romps all their lives and for once you will be close to the greatest thing in life—the love of your youngsters.

If you will follow this idea you will never be sorry and in the doing you will know **what one man thinks**—and did.—*Truck Transportation*, Selden Truck Corp., Rochester, N. Y.



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as it is the sum of the data gathered by **SKF** organizations in all industrial countries.

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# American Malleable Castings Association's Research Program Bears Fruit

By RALPH S. GILDART

**A** BULLETIN, covering the result of the tensile test of bars sent daily from each plant, has just been issued from the office of Enrique Touceda, Albany, N. Y., consulting engineer for The American Malleable Castings Association. The bulletin throws an interesting light on the results of consistent research work covering a period of years, the value of which has been particularly demonstrated during the past three or four years.

Those who have kept in touch with the commendable work fostered by The American Malleable Castings Association in the improvement of malleable castings will recall the unhealthy condition in which the malleable industry found itself some seven or eight years ago. Except in a few cases, there was at that time no such thing as individual uniformity either in manufacturing methods or of the resultant product of different malleable foundries.

Malleable castings as at present manufactured, in conformity to Association standards instead of being of uncertain quality and lacking in uniformity, are of the highest quality and integrity. The most marked advance in development has been made in the past three and one-half years, during which period the product of Association members as a whole has increased from an average somewhat under 49,000 lb. per sq. in. ultimate tensile strength to over 53,000 lb., and from an average elongation under 10 per cent in two inches to nearly 16 per cent.

The bulletin referred to in the opening paragraph covers the report of bars tested by the consulting engineer for the month of June, 1921, when the highest average percentage of elongation of the Association as a whole was attained, namely 15.77 per cent in two inches, or over twice the elongation required by the American Society for Testing Materials in its standard specification for malleable cast iron.

Since elongation, which is the measure of ductility, is the property on which malleability depends, it will be seen that this report marks a new high level in the research program. Since the first of the year, the rise in percentage of elongation has been steady and uninterrupted, and has increased a full two per cent.

The high water mark for average ultimate tensile strength was reached in April of this year when the figure of 53,530 lb. per sq. in. was recorded. The June value for this property was 53,038 lb. per sq. in. This value is in excess of the A. S. T. M. requirement by slightly over 8000 lb.

A reference to the accompanying chart showing average ultimate tensile strength and elongation for the product of the membership as a whole, for 1918, 1919, 1920 and the first six months of 1921, indicates clearly how these two properties have increased during this interval. The average of both properties has always been well in excess of the A. S. T. M. standard requirements of 45,000 lb. per sq. in. tensile strength and 7½ per cent elongation in two inches. It is clear that this margin, when added to the factor of safety already included in the standard specifications, offers exceptional safeguards to the user of those malleable castings furnished by a majority of the members of the Association.

The study of this chart shows a gradual increase in both tensile strength and elongation, with but occasional slight retrogression to values never reached before. It will be noted that the two curves run fairly parallel, rising and falling together, a characteristic of malleable iron which is rather unusual for ferrous materials, the reverse normally being true.

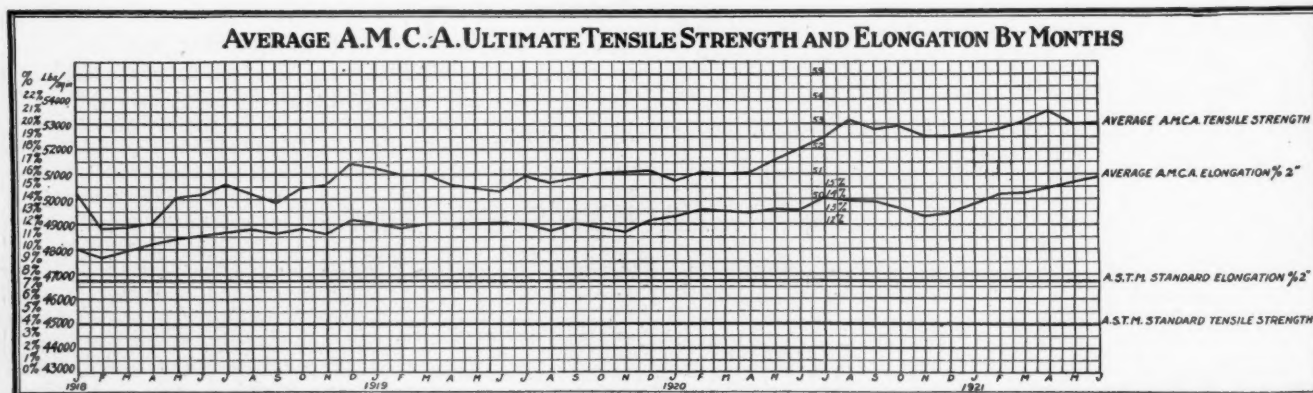
The constancy in the average values of these properties is readily accounted for by the fact that new plants were added to the list of test bar contributors. None of these had previously profited by the research work, and their submitted test bars in most cases had the effect of low-

ering the general average of the Association, until after such time as the effect of the new influence began to assert itself. Improvement in quality of the new contributors through the assistance of the consulting engineer, however, had the effect of a steady and rapid increase in both physical properties. The slight retrogression in the average values of both properties marked by the dropping of the curves from August to November of 1920, is explained as having been due to the serious handicap experienced by the foundries in getting good pig iron and coal during that exceptional period of demand for all commodities.

The bulletin reveals that a high percentage is maintained in the quality of membership product. Standard specification requires 45,000 lb. tensile strength or 7½ per cent elongation in two inches. June, 1921 shows 87% efficiency.

This general improvement of the product of all members is reflected in the number of certificates that were awarded by the consulting engineer for the quarter ending June 30th; sixty-one plants, having been awarded the coveted certificates, the highest number yet issued for any one quarter. The awarding of a certificate is not based upon the test bar record alone; the general plant practice as reported by the consulting engineer's corps of inspectors being considered in its effect upon the product. Through this safeguard the purchaser is assured that the test bar record of each day's production can be considered as truly representative of the casting. Castings furnished by certificate-holding plants are designed as "certified".

Nothing could more clearly indicate the value of a research program consistently carried out and rigidly applied than a comparison of this most recent report with those that have preceded it. The net result of this work has been to raise to a high level the standards of a great industry, and to increase materially the commercial applications of its product.





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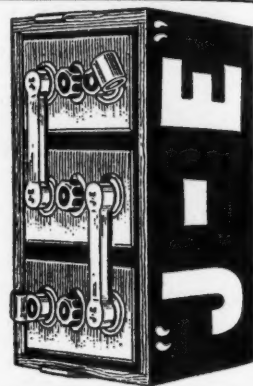
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